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AMERICAN ANTIQUITY

VOL. IX JANUARY, 1944 NO. 3

UNDERGROUND HOUSES ON THE BRITISH COLUMBIAN COAST

H. G. BARNETT

SEMI-SUBTERRANEAN houses with an entrance through the roof are a well known feature of the interior of British Columbia, having been described for the Thompson, the Chilcotin, the Shuswap and others of the upper Fraser River valley. They have, in fact, an even wider distribution east of the Coast and Cascade Ranges, extending south over the Plateau and into northern California.[1] Although this type of dwelling existed among the Aleuts, it appears that the coastal people to the south of them, even in Alaska,[2] were either unfamiliar with the pattern or rejected it in favor of others. Sporadically, along the Pacific Coast all the way from California to Bering Sea, house floors were excavated to varying depths, sometimes even to two levels;[3] but, everywhere, the houses characteristically lack the roof entrance and, except for sweathouses in the south and Bering Sea Eskimo dwellings in the north, even the idea of an earth covering is absent.[4] In view of this fundamental divergence, it is interesting that subterranean structures do appear in several places on the coast of British Columbia.

The earliest indications of this occurrence among a people regarded as belonging to the North Pacific Coast proper were three references to the use of underground dwellings in the Bella Coola myths published by Boas.[5] Apparently, the only entrance to the stone-walled chamber described was through a hole in the roof, by means of a notched log ladder. An episode in one of the tales develops around this entrance way and the possibility of closing it off and suffocating a character trapped within.[6]

More recently, Harlan Smith found material evidence for the existence of this type of dwelling among the Bella Coola. In 1925, he re-

[1] Waterman and collaborators, 1921; Ray, 1939, p. 133.

[2] de Laguna, 1934, pp. 159–161. [3] Niblack, 1890, p. 306.

[4] Waterman (1921, pp. 30–31), on the basis of the data available to him, was prepared to draw a clear cultural distinction between the plank house with pit and the conical earth lodge: "The two types, conical and rectangular, are never found existing together." [5] Boas, 1900, pp. 64, 79, 87.

[6] Although I cannot find the reference, I believe that Boas has called attention to these myths, and has also suggested that the ceremonial entrance through the roof of a plank house by the Hamatsa initiate may be a survival of this custom among the Kwakiutl.

ported upon the remains of what appeared to be a semi-subterranean house on the reservation at Bella Coola, British Columbia, at the head of Burke Channel.[7] The excavation, however, was not deep, measuring only two feet exclusive of the one-foot embankment which ran around the pit. As evidence of its antiquity, Smith cites the fact that a hemlock trunk two feet in diameter stood where it grew out of the floor level. No information is offered as to the manner of entrance into the house.

In 1936, the writer was surprised to hear informants on the mainland side of the Strait of Georgia, from Vancouver to Bute Inlet, describe subterranean structures of one kind or another as an item of their aboriginal culture. The first account received, although it was unambiguous, was dismissed as an inexplicable fancy or as a confusion of reference; but subsequent descriptions volunteered by other informants left little room for doubt. Apparently, the Coast Salish on the mainland did build underground houses and retreats at various periods in their history, although those on Vancouver Island did not. With one exception, however, the entrance-ways were described as inclined passages or tunnels, not as hatchways through the roof. This fact adds somewhat to the confusion of an already complicated problem, since Birket-Smith, de Laguna, and others have accepted the mode of entrance as a diagnostic feature of earth covered house types, and Birket-Smith has used it in his definition of sequences in northwestern America.[8]

Describing the situation as it existed in the days of his great-great-grandfather, a Klahuse informant asserted in 1936 that the winter houses of his people at the head of Toba Inlet were all underground. The village was about ten miles up the Toba River, and the informant claimed to have seen the remains of the pits. Originally, they were about ten feet deep, and rectangular, with a pole lying on the midline across the excavation. Two or three posts supported this member, which in turn supported cross pieces reaching it from two sides of the pit. Poles, brush, and bark were added for the roof and the whole was covered with earth. There was no top entrance; a gangway sloped down to the floor level for entry, and for flight in case of attack a tunnel led out the back way. This was the winter resort of the Klahuse. At the same time they came half-way down the inlet to Salmon Bay for summer fishing. There the village of plank houses was stockaded and an escape tunnel led from inside the enclosure to a point in the woods, or, according to another informant, to an underground refuge chamber. This arrangement prevailed, it was said, until the following generation, when the pit houses were abandoned and the Klahuse took up winter residence in

[7] Smith, 1925, pp. 176–177.

[8] Birket-Smith, 1929, p. 54; de Laguna, 1934, pp. 159–162.

their plank houses at Salmon Bay. Accepting the evidence that the informant was eighty-five years of age in 1936, and reckoning twenty years to a reproductive generation, we may roughly establish the date of his great-grandfather's birth as 1790. Assuming the latter was thirty at the time of the removal, we arrive at a tentative date of 1820 for the abandonment by the Klahuse of their underground dwellings.

To the southward, another ethnic group, the Slaiamun, lived near what is today the mill town of Powell River. In the course of our discussion of warfare a Slaiamun informant volunteered in 1936 that his people used to build semi-subterranean retreats for the protection of an extended family group in war times. There were four of these that he knew of: one on Scuttle Bay, about four miles north of Powell River; another on Grief Point, about four miles south of Powell River; and one each on the east and west shores of the southern tip of Cortez Island. What appeared to be the remains of the excavation at Scuttle Bay were still visible in 1936. One ridge of earth ran roughly parallel to and about seventy feet from the beach. It was 60 to 70 feet long. A second ridge connected at right angles with the north end of the first, and, after twenty feet, faded into the slope of the beach. The area between the two ridges was depressed but, since it was within what might be called the yard of an adjacent Indian house, the ground had been turned over and smoothed so that nothing else was visible on the surface.[9]

The informant was certain that this was once a refuge, not in his father's time, but perhaps during the lifetime of his grandfather; and furthermore, that it was not only a shelter for a day but was lived in over troubled periods. His father had told him that the excavation was six feet deep with a flat roof of logs and planks laid flush across the opening and covered with earth. The entrance was near the corner and by an inclined approach. Curiously, the dirt walls were not planked up. Recesses were cut into them for beds and storage space.[10]

This is a strange adaptation but the account was unprompted and can scarcely be ignored. Conviction grows, when to the Slaiamun data we add the information obtained from the Sechelt and the Squamish. The Sechelt formerly congregated during the economically inactive

[9] The occurrence of artificial ridges enclosing depressions is in itself no positive proof for underground chambers, or even for pits. They occur in many places on the Strait of Georgia in other connections. Informants in 1935 pointed out some of these on Vancouver Island, near Comox and Deep Bay, and described them as embankments for the reception of stockade timbers. Earth was also banked up around the walls of some plank houses. See also Smith, 1907, pp. 321, 385–386, 433.

[10] These niches recall the sleeping (or sweating) places found in the prehistoric Ainu pit dwelling, as well as in those on Cook Inlet and Kodiak Island (Munro, 1911, p. 68; de Laguna, 1934, p. 143; Petroff, 1884, p. 141).

winter season in permanent plank houses at Pender Harbor; the Squamish gathered on the river by that name at the head of Howe Sound. Stockading, the commonest means of village protection over this general area, was not resorted to by these groups. Instead, they built underground rectangular retreats, entered by secret passageways leading from the plank house by a concealed opening in the floor.

The Slaiamun informant knew of the Chilcotin dwellings, but he felt that the structure he described was somewhat different. It was a "fighting house." On Scuttle Bay, at the site of the excavation, there was hardly enough room for other buildings. Perhaps one large plank house nearby would have been sufficient to contain the extended family which took refuge in the underground room, since this location was a summer fishing spot and consequently was not frequented by the members of the entire winter village which made up the Slaiamun group.

From the Muskwium group, who lived on Point Grey, near Vancouver, comes a more orthodox but nonetheless interesting account. They lived in plank houses, but at the same time they also made use of subterranean dwellings, a circumstance which definitely brings the distribution of this type of habitation to the coast. The ground for this house was broken by wedges which were driven in and wiggled from side to side. The loosened dirt was scooped into baskets and lifted out of the pit by a cord. A flat wooden blade served as a shovel; and a maple stick crooked like a hoe was also used. The roof of the house was said to be flat. It was supported by a central post on top of which rested two logs crossing at right angles. Other poles radiated to the periphery and the angles between them were subtended by short planking, the whole being covered with mats and, finally, earth. The entrance was by way of a hole in the roof, either at the center or at one corner. Sometimes there were posts at the four corners. Entrance was by means of a notched-log ladder. The dimensions of the pit were given as approximately 15×15×10 feet deep. It was roughly rectangular, but a rounding of the corners caused it to approach the circular. The dirt walls were not plank-lined but had mats on them like the walls of the plank houses by which they stood. The Muskwium informant had seen three of these pits in what are now the vegetable gardens of a secluded Chinese community on the site of the old Indian village.

Not every Muskwium family owned or had access to an underground dwelling. Its construction was a family enterprise and was costly in labor. It was used only in the coldest part of the winter and as a rule no cooking was done there. There was no general abandonment of the plank houses; the subterranean chamber was slept in when it was cold, and the weak and infirm spent most of their time there in bad weather. Some did move into them, but they were decidedly a luxury.

The occurrence of this kind of accommodation among the Muskwium does not create a problem, though its extension to the very mouth of the Fraser River has received no notice in the literature, so far as is known. Hill-Tout has mentioned its existence a short distance upriver among the Tcil'qē'uk (on the Chilliwack River), where it was "occasionally used."[11] Doubtless these people derived the practice of building winter habitations in this fashion from the Thompson bands who lived not far above them on the Fraser River, where subterranean structures were commonly used during the winter.

The other underground resorts of the Coast Salish are not so easy to explain. The floors of their plank houses, especially those on the mainland side, were not ordinarily excavated, and when they were it was only to a depth of from one to three feet, this measurement sometimes varying on the sides of a single dwelling because of the slope of the ground upon which it was built. The most obvious explanation for the deeply excavated dwellings and refuges of the Klahuse, Slaiamun, Sechelt and Squamish is that the trait has been borrowed from the Chilcotin and Lillooet from over the mountains.[12] If we accept this, we must then be prepared to admit that a dwelling has been modified into a refuge, and that the manner of entry into an underground chamber can, and has, been altered from top to side in one borrowing and hence is not a very reliable trait upon which to differentiate cultures or to postulate a chronology of types. If we choose to reject this conclusion, we have an instance, in relatively recent times, of a semi-subterranean dwelling, and several of refuges, with a passageway into the side—a type which Birket-Smith has suggested is antecedent to either the underground chamber with roof entrance or the rectangular plank house[13]—occurring on the coast of British Columbia.

This certainly does not clear up the relation between Eskimo, Kamchatkan, and Thompson River houses; neither does it establish the Coast Salish as a critical link between their congeners of the interior, who enter their winter dwellings through the roof, and the Pacific Eskimo, who do not. The existence of excavated quarters on the mainland but not on Vancouver Island, their occurrence on long sea arms that extend far inland close to the borders of Interior Salish territory, their continuous distribution down the Fraser and the linguistic affiliations

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[11] Hill-Tout, 1903, p. 360.

[12] Waterman (1921, pp. 31–32) has suggested this conclusion, or one conformable with it. He inferred that the development of woodworking on the coast induced a modification of the older underground habitation of the interior, so that "the rectangular house of the coast region with its characteristic 'pit' might be interpreted as a squared-off-pit-dwelling, fashioned out of planks."

[13] Birket-Smith, 1929, p. 54.

of the groups concerned suggest that the most conservative guess would derive the coastal patterns directly from the interior. But the forms and, in part, the functions of the structures in the two areas were certainly different. If we knew something of the antiquity of the Coast Salish practice, we should be in a far better position to draw conclusions. Indeed, until we know more about the archaeology of this vast, comparatively untouched region of northwestern Canada many historical problems, continental as well as local, will remain unsolved.

BIBLIOGRAPHY

BIRKET-SMITH, KAJ

1929. *The Caribou Eskimos.* Report of the Fifth Thule Expedition, Analytical Part (2), Vol. 5. Copenhagen.

BOAS, FRANZ

1900. *The Mythology of the Bella Coola.* Memoirs, American Museum of Natural History, Vol. 2, Pt. 2. The Jesup North Pacific Expedition, Vol. 1, 1898–1900.

DE LAGUNA, FREDERICA

1934. *The Archaeology of Cook Inlet, Alaska.* The University Museum, Philadelphia.

HILL-TOUT, CHARLES

1903. *Ethnological Studies of the Mainland Halkōmē'lEm, a Division of the Salish of British Columbia.* Report of the 72nd Meeting (1902) of the British Association for the Advancement of Science. London.

MUNRO, N. G.

1911. *Prehistoric Japan.* Yokohama.

NIBLACK, ALBERT

1890. *The Coast Indians of Southern Alaska and Northern British Columbia.* U. S. National Museum Report for 1888.

PETROFF, IVAN

1884. *Alaska: Its Population, Industries, and Resources.* Tenth Census, 1880.

RAY, VERNE

1939. *Cultural Relations in the Plateau of Northwestern America.* Publications of the Frederick Webb Hodge Anniversary Publication Fund, Vol. 3. Los Angeles.

SMITH, HARLAN

1907. *Archaeology of the Gulf of Georgia and Puget Sound.* Memoirs, American Museum of Natural History, Vol. 4, Pt. 2. The Jesup North Pacific Expedition, 2, Pt. 6.

1925. "A Semi-Subterranean House Site in the Bella Coola Area on the Coast of British Columbia." *Man*, Vol. 25.

WATERMAN, T. T., and collaborators

1921. *Native Houses of Western North America.* Indian Notes and Monographs, Museum of the American Indian, Heye Foundation.

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March, 1942

THE TYPOLOGICAL CONCEPT[1]

ALEX D. KRIEGER

THIS paper is an attempt to clarify the meaning of the terms "type" and "variation" when applied to archaeological materials. Although they are used constantly in speech and literature in almost every conceivable context, it must be admitted that archaeology has no generally accepted, impersonal methods of establishing the scope and application of these terms. Kluckhohn[2] has recently written:

> Our techniques of observing and recording are admittedly still susceptible of improvement, but they seem much further advanced than our development of symbols (verbal and otherwise) by which we could communicate to each other (without loss or inflation of content) the signs and symptoms we observe. In archaeology, for example, methods of classifying pottery wares on the basis of highly technical and rather precisely defined operations have been elaborated. But I am aware of but a single paper (by a Russian!) where there has been even a tentative and fumbling consideration of the implications of the typological method. Such archaeologists as Vaillant, Strong, Setzler, Gladwin, and Paul Martin are (but only very recently) evidencing searchings of their theoretical consciences, and this is a happy omen. Meanwhile typologies are proliferated without apparent concern as to what the concepts involved are likely to mean when reduced to concrete human behaviors . . . .[3]

If analytical methods fail to interpret archaeological material in terms of "concrete human behaviors," the historical reconstructions based upon them must be in greater or less degree fictitious. Traditionally, masses of specimens are grouped in one way or another to facilitate their description or to demonstrate "culture complexes" and "cultural change" through space and time. Since these groupings, regardless of

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[1] Prepared in connection with researches in Texas archaeology, as part of a program in Research in Anthropology generously supported by the University of Texas. The analysis of material gathered over a period of twenty-five years by the University, and, more recently, by WPA-University of Texas projects, demands the settling of basic methodologies. I am much indebted to Professor J. Gilbert McAllister, Chairman of the Anthropology Department, T. N. Campbell, J. Charles Kelley, Walter Taylor, and Perry Newell for liberal discussion and unstinted criticism. I wish to emphasize particularly that Kelley has long been familiar with the main principles given here, has experimented for some time with graphic devices for expressing the results, and has been very instrumental in shaping my own convictions on the subject.

[2] Kluckhohn, 1939. The paper to which he refers is Gorodzov, 1933. The latter's arguments center about the thought that "this theory demands the subdivision of all material simple objects into categories, groups, genera, and types." To form the first three groupings the types must first be determined, and he cites the many difficulties to be faced. The general insistence throughout is on the careful use of historical methods, but the paper lacks specific statements on how to do this.

[3] This was probably written before the appearance of Rouse's valuable study of type in terms of behavior. (Rouse, 1939, esp. pp. 9–35).

their determining characters, are commonly termed "types," and as such form the medium for nearly all discussion of cultural relationships, it is of the utmost importance that archaeologists reach some agreements on organizational methodology.

THE PURPOSE OF A TYPE

It may be said that, ideally, an archaeological type should represent a unit of cultural practice equivalent to the "culture trait" of ethnography. Although the same difficulties in delimiting such a unit are met in ethnography as in archaeology,[4] it is apparent that both concepts may serve the same purpose, namely, that of identifying distinct patterns of behavior or technology which can be acquired by one human being from another, and thus serve as tools for the retracing of cultural developments and interactions.

In all study of behavior it is essential to distinguish between the traditional or ideal pattern and the actual enactments which result from individual variability in skill, interest, or effectiveness. Variations which never acquire social recognition or meaning beyond their originators are, however, of little historical significance. It is therefore the task of the analyst, working with the variable products of primitive manufacturing techniques, to recover, if possible, the mental patterns which lay behind these manifold works, the changes in pattern which occurred from time to time, and the source of such changes.

Thus the purpose of a type in archaeology must be to provide an organizational tool which will enable the investigator to group specimens into bodies which have *demonstrable historical meaning in terms of behavior patterns*. Any group which may be labeled a "type" must embrace material which can be shown to consist of individual variations in the execution of a definite constructional idea; likewise, the dividing lines between a series of types must be based upon demonstrable historical factors, not, as is often the case, upon the inclinations of the analyst or the niceties of descriptive orderliness.

Before entering upon the possible techniques for accomplishing these ends, we may examine briefly some of the concepts of type most commonly met in the literature. There appear to be four principal attitudes toward the organization and description of material.

1. Full description, wherein specimens are described individually in detail, in the hope that nothing of consequence will be overlooked.

[4] Wissler, 1923, p. 50, defines a trait as a "unit of observation," as, for example, a fire-making instrument; "Such is, for practical purposes at least, a unit of the tribal culture and is spoken of as a trait." In practice, a *particular style* of instrument would constitute a more tangible trait than Wissler's definition calls for.

2. Visually determined "typologies," wherein grouping is primarily to reduce repetitive description, the divisional criteria being chosen at random or based upon impressions received through personal experience.

3. Classification systems which aim toward the standardization of description and comparison over wide areas. These generally take the form of outline headings and subheadings, expressed by symbols, which provide a series of pigeonholes into which specimens are sorted and then tabulated.

4. The true typological method wherein types are taken to be specific groupings of structural features which have proved historical significance. Determinative criteria are not of constant value, but are discovered as the material is analyzed, in the manner to be discussed below.

Of methods (1) and (2) there is not a great deal to say except that the first leaves the digestion and meaning of the material to the reader to discover for himself, while the second may or may not be reliable for comparative purposes, depending upon how much explanation accompanies the presentation. In the case of isolated or new material which is little understood, the full-descriptive method may be the only possible one, but where quantity of comparative material permits reduction into better defined groups, one of the other three methods may be used. Of these, the use of "classification systems" has enjoyed wide popularity among archaeologists, and considering the vast amount of time and thought put into the perfection of such schemes, we may examine their basic tenets critically.

CLASSIFICATION SYSTEMS

Although the purpose of schemes presented in the literature must generally be taken for granted, a few authors have troubled to explain their position. Nelson,[5] for example, has written as follows:

> . . . The naturalists since Linnaeus call their system of grouping *The Natural Classification*. In zoology this seems to mean nothing more or less than grouping so as to express blood relationship. In archaeology it would mean grouping by primary, secondary, and tertiary characters or traits in such a way that when the task is done the whole can be assembled in the shape of a sort of genealogical tree, in which those forms showing only the basic or primary traits would appear near the bottom or stem, while those forms showing various secondary modifications and specializations would appear near the top or on the branches, some distance away from the stem. The obvious advantage of such a system is that it hangs together and therefore, once it is grasped, will be easily remembered, while any other *artificial classification* is not, in all probability, going to be easy to remember and therefore cannot be successfully used unless we carry a printed copy of the scheme about with us.
>
> As to how such a system of classification is to be devised, or whether we are fully ready to devise it, and to use it, I am not at all sure. Several attempts are already on

[5] Nelson, N. D.

record and these, so far as I have examined them, all have their particular excellences and defects. Broadly considered, they are more or less satisfactory as far as they go; but they are not complete and, worse than that, they tend to end up in confusion because the makers have generally failed to distinguish primary and secondary classificatory characters. That is, of course, merely another way of saying that there is no one basic idea or underlying trait running through and thus connecting up the whole scheme, but, instead, several unlike traits have been given equal value. All this is natural enough in first empirical attempts in a new untried field, and our recognition of previous shortcomings should at least help us to avoid some of the useless modes of procedure. The various earlier attempts also suggest that a really adequate system of classification may not be a one-man job, or at any rate that it may have to come by slow growth. The chief thing required at present, obviously, is to find the right start. Towards this proper beginning, as well as the future completion of a classificatory scheme, we can all make our contributions, or at least supply suggestion.

Nelson has stated well the exploratory nature of the problem, although his suggestion that classification systems may eventually lead to formation of a "sort of genealogical tree" on the basis of primary and secondary characters is open to serious question. The supposition that such characters exist in archaeological material reflects a common attitude towards classification problems which may have no basis in fact.

Deuel[6] has expressed a different point of view:

The need for a convenient grouping of chipped stone and spearpoints is indicated by the occasional publication of tentative classifications. For the comparison of specimens from different regions or tribes, for the preparation of state surveys, or for the investigation of the distribution of types, a simple, easily defined classification is highly desirable.

Such a classification should answer the following requirements: (1) simple major divisions of easily distinguished forms, (2) each capable of further separation into a small number of sub-types, and (3) these last susceptible of continued subdivision where necessary to embrace readily the majority of divergent shapes. A type and its sub-types should depend on a small number of related criteria, and be easily differentiated from other types and sub-types without necessity for frequent references to a complicated key.

Deuel, like Nelson, stresses *convenience* and the facilitation of memorizing the structure of a system, so that once it appears workable it can be applied anywhere without reference to the original key.

In one of the early attempts to formulate an artifact classification, Thomas Wilson[7] offered a brief statement of purpose:

These engravings are intended to serve as a classification of these implements by which their names, and possibly their functions, may be known, and by which archaeologists throughout the country, and perhaps the world, may be better enabled to understand and describe them. When we consider that it is beyond the power of mere words to describe a form, and that a figure, cut, or representation of it must be or must have been made at some other time in order to communicate knowledge of a form to any person

[6] Deuel, N. D. On July 11, 1939, in response to a plea from the Anthropology Department, University of Texas, for information on the subject, Mr. Deuel kindly forwarded this manuscript together with copies of several others on projectile-point classification. [7] Wilson, 1899.

who has not previously seen it, the author trusts that he will be justified in the classification and the engravings by which it is sought to be represented.

Wilson's classification formed the basis for several subsequent schemes which have been widely used, especially in the far western states.[8]

In certain circumstances, systems have been devised for the reduction of masses of material into a digestible form to facilitate reference.[9] Still others have been presented for the consideration, and presumably for the use, of other archaeologists, without statement of purpose.[10] There are also examples of classifications which appear to be mixtures of grouping by form and distributional knowledge, yet we look in vain for explanations as to how the "types" were determined.[11]

Some of the early classifications attempted to employ historical knowledge based upon European archaeological horizons. "Primary" traits corresponded to the narrow range of simple artifact forms characteristic of the Lower and Middle Palaeolithic periods, while "secondary" groupings were determined by the more specialized and diversified forms appearing in subsequent periods.[12] The assumption in these cases was that the specialized forms were genetic descendents of earlier generalized ones, the supposed evolution having taken place within the same region.

Most of these classifications consist of balanced outline divisions, each symbolized by a combination of letters and numbers which provide the key to the outstanding features of shape, proportions, workmanship, etc. For the sake of symmetry and ease in memorization the headings and subheadings are usually carried out into a complete system of pigeonholes, whether or not specimens are found to represent all of them. The number of headings to be carried varies with each author's inclinations and the complexity of the general material. The classification of axes, for example, is simple in comparison with that of projectile points. The ultimate purpose of such systems is either stated or presumed to be one or more of the following: (1) to standardize comparison of specimens over wide areas, (2) to save time in sorting, tabulating, and describing masses of material, (3) to provide convenient reference forms and terms to expedite field recording, surveys, and cataloging. *Whatever the reason and method behind such schemes, their authors automatically refer to each grouping as a "type."* This bespeaks an assumption that all

[8] For example: Gifford and Schenck, 1926; Strong, 1935, esp. pp. 88–89. The so-called "Strong system" was in use, but in an incomplete form, in the earlier work of Gifford and Schenck.

[9] For example: Kidder, 1932; Lillard, Heizer, and Fenenga, 1939; Gifford, 1940.

[10] Rau, 1876; Renaud, 1931; Renaud, 1934; Finkelstein, 1937.

[11] For example: Fowke, 1896, pp. 47–178; Cole and Deuel, 1937, esp. Chapt. IV.

[12] Wilson, 1899, pp. 888–889, cites several such cases.

that is needed for the delimitation of archaeological types is the perfection of successive subdivisions from the "most important" to the "least important" characters. Without entering into details, these premises may be variously criticized.

1. In arranging and balancing an outline of divisional criteria, it becomes necessary to give preference to some criteria over others; that is, to choose those that are "basic" for the main divisions. This choice may be guided by several considerations: by the frequency with which certain simple geometric figures such as the triangle, oval, and rectangle appear in a series; by real or supposed historical changes in form; or by arbitrary "logic." Now, the search for morphologically "basic" characters on which to build a classification is fallacious because the frequency with which certain shapes occur constantly shifts in different runs of material. Therefore, while form is a consistently valuable criterion when interpreted in conjunction with other characters, its use as an *aid* in defining types should not be confused with its use as a *base* for classificatory headings. On the other hand, the use of historical periods in the formation of a typological system is largely a matter of putting the cart before the horse, for the reconstruction of historical change should depend upon the correct ordering of known types and traits. Furthermore, the proof of genetic relationship in a series extending through successive historical periods is one of the major objectives of research and cannot be assumed to be a working tool in the analysis.[12]

2. Specimens which in actuality form a closely related group of variations may be forced, by the demands of a classification arrangement, into positions far removed from one another in the tabulations. If the divisional criteria are strictly followed—and they usually are for the sake of "scientific accuracy"—it is constantly necessary to make hair-splitting decisions on individual specimens, finally assigning them to one group or another on the basis of a final desperate summary of their minute differences, or, which is worse, by forcing artificial lines through them for lack of really decisive breaks. Persistent and complex overlapping in features of construction *may* be the very proof that the series should not be broken down in answer to outline subheadings. Again, a breakdown which works well in one collection may be hopelessly arti-

[12] When the archaeology of restricted regions is known well enough and there are ample typological data from distinct but connected cultural horizons, it is sometimes possible to state with assurance that certain types of material have developed out of others. The papers of Gila Pueblo, for example, contain numerous developmental charts dealing with pottery and projectile styles. However, unless accompanied by ample proof of descent, such charts may be largely imaginary.

ficial in another. The inflexibility of outline systems precludes their adaptability to such conditions.

3. Conversely, specimens falling into the same pigeonhole because they answer a given set of selected criteria may, through other differences, actually belong to two or more completely distinct cultural types.

4. It is next to impossible to express variation in an outline system except by increasing or decreasing the number of subheadings—the number of criteria, that is—that are considered pertinent to the problem of discovering relationships. The broader the application of a system, as, for example, a projectile-point classification proposed for continental standardization, the more features of construction must be arbitrarily dropped for fear of overburdening the system with symbols. Such reduction leads back to the endless and unanswerable speculation on what features are of basic importance in comparative studies.

5. The arrangement of outline pigeonholes under a selection of main headings is apt to carry the implication that the subdivisions under one main head are more closely related with one another in the genetic sense than they are with the subdivisions of any other heads. This may be true in certain circumstances, as when coiled basketry techniques form one major grouping, twined another, plaited another, etc., while in the field of chipped stonework any presumptions as to genetic relationship for a starting point would only lead to complete and needless confusion.

In summary, the objections to classificatory "systems" which are being created from time to time for the standardization of analysis may be expressed somewhat as follows: considering the vast amount of time and thought put into them, is there any reason to believe that their groupings will help to discover the true historical meaning of the myriad works of man? If not, what sort of method will serve this end? We will now consider what may be called "the typological method," though I am not aware that it has been so termed or described before, as a definite approach to analysis.

THE TYPOLOGICAL METHOD

The general tenets of this method may be seen in the formation of Southwestern and Southeastern pottery types. Thus each recognized type is defined by a specific and cohesive combination of features of paste, temper, texture, hardness, finish, vessel shape, technique and arrangement of decoration, use of appendages, etc., and furthermore includes what is believed to be individual variation within the technical pattern; the type as a whole is also understood to occupy a definable historical position, that is, its distribution is delimited in space, time,

and association with other cultural material.[14] It must be thoroughly grasped that this approach represents an *attitude* toward the archaeological analysis which is almost diametrically opposed to that of the classification method. The differences between them center about the manner of choosing and applying determinative criteria to specimen grouping; where the classification method is rigid and unadaptable to varying conditions, the typological method is flexible and can be adjusted to the material and problems at hand. The theoretical scope of this concept may be summarized under these points:

1. Each type should approximate as closely as possible that combination of mechanical and aesthetic executions which formed a definite structural pattern in the minds of a number of workers, who attained this pattern with varying degrees of success and interpretation.

2. Each type, with its probable variations, must hold its form with essential consistency wherever found. *Absolute* consistency is neither possible nor necessary for the analysis. With geographical spread of a type, slight alterations in the structural pattern inevitably occur.

3. Distinguishing criteria for type determination are not of constant value; what may serve to differentiate types in one circumstance may prove to be variation in another. The number of criteria needed for proof of clean distinctions may also vary with circumstances.

4. No matter how small the difference between specimen groups, these differences are of type importance if their distributions in space, time, and cultural association are distinct.

5. There are no criteria of basic or universally primary importance in forming a typology. Each *specific combination* of features—i.e., the manner in which they combine—is of greater determinative value than any single feature.

6. The differences between types must not be so obscure that others will encounter excessive difficulty in recognizing them.

7. The typological framework for any given class of material must be flexible enough to allow for additions, subdivisions, recombinations, rewordings, and the like, in the groups where needed, without disturbing others.

8. A type, when satisfactorily blocked out, must be named (not numbered or lettered) and described. Names may be derived from sites,

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[14] Several handbooks serve to illustrate the framework of pottery-type description, such as: Gladwin and Gladwin, 1930*a*, 1930*b*, 1931, 1933; Hargrave, 1937; Hawley, 1936; Gladwin, Haury, Sayles, and Gladwin, 1937. The last-mentioned work departs from the others in that type description is considerably shortened but supplemented with copious drawings of vessel shapes and decorations, thereby greatly adding to its usefulness for comparative work. For the Southeast, see the mimeographed reports of the Southeastern Archaeological Conference, esp. Vol. I, 1939; Ford and Willey, 1940.

towns, persons, geographical features, etc., but to avoid confusion and unwarranted assumptions they must *not* be taken from ethnic, linguistic, or other cultural labels. Some names derive from the sites in which they were first discovered in situ. The type is thenceforth known by the same name wherever found, but only so long as its identity with the original find can be ascertained.

Descriptive forms for pottery types have been devised in the Southwest and Southeast (see note 14), but as yet do not exist for other classes of material. In the next section, one will be suggested for projectile points. It is desirable that other such forms be created for all major classes of archaeological specimens, as well as for house and burial types. Basketry techniques, knives, scrapers, axes, bone implements, various ornaments, pipes, ceremonial objects, etc., all lend themselves to the typological method of organization and description.

Procedure by the Typological Method

The first problem facing the analyst is the sorting of specimens into major groups which *look as though they had been made with the same or similar structural pattern in mind.* This step is somewhat subjective, for there will be different opinions on what amount of variation can be

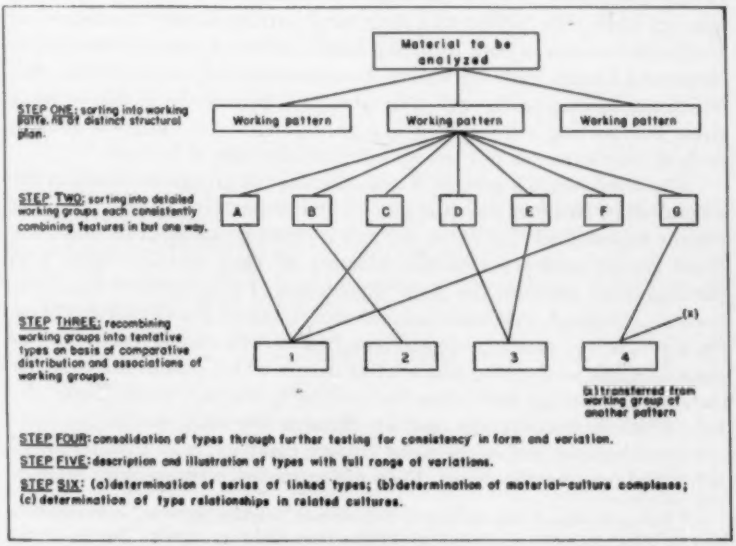
Material to be analyzed
STEP ONE: sorting into working patts. as of distinct structural plan.
Working pattern
Working pattern
Working pattern
STEP TWO: sorting into detailed working groups each consistently combining features in but one way.
A
B
C
D
E
F
G
STEP THREE: recombining working groups into tentative types on basis of comparative distribution and associations of working groups.
1
2
3
4
(x)
(x) transferred from working group of another pattern
STEP FOUR: consolidation of types through further testing for consistency in form and variation.
STEP FIVE: description and illustration of types with full range of variations.
STEP SIX: (a) determination of series of linked types; (b) determination of material-culture complexes; (c) determination of type relationships in related cultures.

FIG. 25.—Diagram of procedure in the typological method.

allowed for. The main point is to sort the material into groups which contrast strongly. The collection need not be completely sorted, questionable or odd specimens being set aside for the present. This initial sorting into trial patterns is largely experimental, and differences of opinion over what constitutes a pattern will be more or less eliminated during succeeding steps. The greater the number of specimens available, the stronger and clearer will be the main contrasts.

It cannot be said too strongly that, during the primary division into working patterns, one must expect similarities and differences to manifest themselves in almost any character in almost any degree. There is no set order of examination and it matters little what the habits of different analysts may be in this respect. Thus in projectile-point sorting, the various features of stem expansion or contraction, shoulder width, base shape, blade shape, proportions, method of chipping, etc. must all be considered, but without insistence on any particular order. Likewise, such categories as pottery and basketry should be free from preconceived ideas of the relative importance of any particular characters of shape or treatment.

The second step is the breakdown of the working patterns according to differences which are seen to be consistent within some, but not all, of the specimens in each pattern. For example, a series of pottery bottles, while they belong to a structural pattern readily distinguished from other vessels in both form and function, may reveal details of neck shape and length, body curvature, base construction, paste, finish, etc., which are consistent through a number of specimens from one or more sites. This sorting will result in a large number of very uniform groups, each of which reveals but one specific combination of features.[15]

The third step is a process of recombining the groups obtained in the second step, through the study of their comparative distributions. It cannot be assumed that there are any *a priori* grounds for recombining these groups without a careful plotting of their distributions. This plotting must consider the three dimensions of geographical (i.e., site-to-site), temporal, and associational occurrence of the detailed groups. *Only* in this way can it be determined that certain characters are variations of single underlying plans, while others which do not fall together consistently are not variations but culturally distinct ideas. Those details which do consistently combine through site after site, in the same temporal horizon and in the same culture complex, may thus be safely regrouped into *tentative types. These differ from all other so-called types in*

[15] It may be argued that the step of division into "working patterns" is unnecessary because these patterns are subsequently broken down and then rebuilt. They do appear to be an aid in visualizing and organizing the material in its initial stages, especially if great quantities of specimens must be examined in limited space.

that the cohesiveness of their elements has been proved through the use of archaeological data rather than simply supposed through a variety of assumptions.

The fourth step consists of testing the "tentative types" of the third step with whatever further information is available. New collections may provide a valuable testing ground, so that it becomes possible to check the persistency with which the elements of each proposed type fall together again and again, *in the same essential pattern with the same variations.* It often comes as a pleasant surprise to see what one has regarded as a definite type turn up in some other area or collection with exactly the same features. Exact duplication is not, however, necessary for type identity, for differences in natural materials available may directly affect the workmanship and final appearance of objects made with quite the same plan in mind.

In the fifth step, after they appear to be satisfactorily composed and tested, the types must be named and described. As I do not know of any descriptive form for materials other than ceramic, the following is offered merely for illustration. Similar forms can easily be devised for any material category. Names may consist of a site or locative term plus some identifying words which stress the least variable feature within the type. There is nothing particularly significant in the order of itemization, for distinguishing features may appear anywhere in the description. A sample form which may be used for projectile points is given below.

SAMPLE TYPE DESCRIPTION FOR PROJECTILE POINTS

TYPE: YARBROUGH STEMMED

Illustrated: plate ____, figure ____

Greatest width: across shoulders.
Stem: edges usually concave in uniform curve from shoulder to somewhat flaring stem tip, but grades into straight edge without flare; edges are commonly ground or rubbed smooth.
Base: usually concave with sharp stem tips, but grades into straight line.
Shoulders: slight and formed only by outward curve of stem edges meeting blade corners.
Blade: edges essentially straight but may be irregular with crude chipping; usually, if not always, beveled with two parallel pitches on opposite faces; bevel narrow and difficult to see if chipping crude.
Cross-section: stem elliptical; blade more or less rhomboid with convex faces.
Material: poor grade of flint or "chert," dull reddish or grey.
Chipping: percussion, with pressure retouching along beveled blade edges.

Dimension ranges:		(334 specimens)
A. Widths:	Base:	14–18 mm.
	Stem neck (narrowest part above base):	12–15 mm.
	Shoulders:	17–22 mm.
B. Lengths:	Stem (base to constriction below shoulders):	14–19 mm.
	Blade (remainder of specimen):	21–39 mm.
	Total:	38–55 mm.
C. Thickness:		5– 8 mm.

Distribution: see map 3. All in situ specimens from Fred Yarbrough site, Van Zandt County; surface specimens from Wood County. Insufficient data for placement in definite focus but apparently earlier than Sanders Focus.

Such a form would naturally have to be fully supplemented with line drawings and photographs so as to make the variations clear.

Those specimens which were set aside as uncertain or aberrant in the initial step may now be re-examined. Many of them may be typed as the result of a better understanding of the various type compositions; the remainder may be illustrated individually and labeled "miscellaneous" or "unclassified."

The sixth step consists of the employment of typological knowledge in the reconstruction of cultural relationships. If enough data are available, the plotting of type distributions in space, time, and association may reveal consistency in the way that certain types tend to fall together in site after site. Such persistently associated types, within the same material category such as pottery, basketry, projectiles, etc., are now termed "series" in some quarters. In early Mogollon the pottery complex centers around the "Alma series": Alma Plain, Alma Punched, Alma Scored, Alma Neck Banded. In an early Southeastern period, Alexander Incised, Alexander Pinched, and Alexander Dentate Stamped form an "Alexander series." With ample evidence that such linked types, together with some others bearing different names, occur repeatedly in close association, it eventually becomes possible to shorten the identification of material as belonging to a "series" representing a single culture during a restricted time period. Thus it may be said that a certain run of pottery belongs entirely to the Texarkana Focus series, and so on.

An aggregate of types in different categories of material culture may be termed a "complex" if all types belong to a definite, delimited cultural configuration. The complex may be named after the key site or locality in the same way that a focus or phase is named.

Again, it is sometimes demonstrable that several well established types, each of which is normally identifiable with a distinct culture complex, are in fact related to one another because continuities of one kind or another show that the cultures are related. This circumstance involves the problem of genetic affinity in the products of human activity. The postulation of such affinity is based upon the principle that objects of a generally similar appearance found in related cultures are the products of changing tastes or values wrought upon some original ancestral form. Arguments for genetic affinity and evolution in artifact types must, however, be regarded with great caution. Rouse[16] has discussed this point and employed the term "replacement" as an alternative culture process to evolution:

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[16] Rouse, 1939, p. 14.

The concept of "replacement" should not be likened to the concept of "evolution." The latter implies development of artifact types, somewhat like the growth of plants. Replacement, however, expresses merely a change in types or modes. Each type is assumed, by definition, to be an immutable pattern. Hence, it cannot grow or evolve like a plant. It merely comes into existence, persists, and dies out. It is analogous to a culture trait which diffuses, not to an artifact which evolves.

Rouse has further discussed the various aspects of historical reconstruction based upon established types:[17]

The set of concepts used in this study for reconstructing history from the distributions of the types and modes may be termed "processes." They conceptualize the distributions, so as to make them represent historical events. Each process indicates the history of an individual culture trait along the paths of its distribution . . . the processes can also be used to express the histories of trait complexes . . . .

The complete set of processes, then, is the following. A type or mode may have come into existence at a site by *origination* on the spot, or by *diffusion* from a neighboring tribe. It will then *persist* for a certain length of time, at first (perhaps) *increasing in popularity*, later *decreasing in popularity*. Finally, the type or mode will die out, either by becoming extinct or by *replacement* by another type or mode.

In other words, the proof of evolution in cultural products by means of exhaustive historical study is one thing, its assumption on the basis of visual impressions of similarity quite another. Thus basic relationships between specimens cannot be *assumed* to exist in any form, however close their superficial resemblances may be.

The Status of a Subtype

In general usage, the concept of "subtype" is that it provides a subdivision primarily useful in clarifying a description. For example, a pottery type may include several vessel shapes and design motifs, or different pastes and colors. To make such a composition easier to describe and illustrate, recourse may be taken to "subtypes."

As envisaged herein in connection with "the typological method," the subtype is a purely temporary placement of a specimen group which cannot definitely be termed a variation of one type or a type in itself. The implication is that when sufficient evidence is gathered, the group will either become a type or will be incorporated as a variation in another known type. If all specimens could be satisfactorily typed there would thus be no subtypes.

The description and illustration of complex types with much variation may then be itemized and explained to the extent that their content is clear. This may be done through forms devised for the purpose or through simple itemization lists of "modes" such as used by Rouse[18] for Haitian material.

[17] Rouse, 1939, pp. 14–15. Italics mine. See also the discussion in Ford, 1938.

[18] Rouse, 1939, pp. 42–56.

Application of the Typological Method

The significance of the above discussions is already quite clear to many archaeologists, and we are particularly indebted to certain pioneers in Southwestern pottery research for having put the principles into practice. What is now most needed is a general application of the same analytical concept to all archaeological remains, and a general dissatisfaction with anything that falls short of it. There are, of course, many instances of new or isolated material which cannot be accurately typed for lack of distributional knowledge, and in such cases one must describe the material as fully as possible.[19]

There is considerable danger in the presentation of so-called types drawn up without comprehension of their implied meaning, for the "facts" of relationship and sequence deduced from them may be quite unreliable. Often a loose usage of the term is fairly obvious, "type" being applied to any kind of difference between specimens, or even between individual parts of specimens. Illustrations accompanying such works may show nothing more than a scattering of objects, perhaps only the complete or "best" specimens, or those that particularly interest the author. This difficulty probably is largely due to failure to handle the problem of variability, i.e., what kinds and how much of it are to be included in each type range. The typological method is directed specifically at this problem, with the conclusion that variations can only be determined through careful distributional comparison of all executional elements. There appears to be no possibility of devising "standard" classificatory systems, for procedure must be adjusted to the material and problems in given areas, with a maximum of flexibility.

It is also essential that when a typological analysis is made, there be some adjustment in its perspective. Too-general inclusions will tend to obscure differences which may well have real historical significance, while, conversely, too-fine divisions may raise individual or minor local variations to an unwarranted importance. In the long run, it appears likely that the typological method will act toward reducing our great masses of objects into fewer and more cohesive groupings than we now face, with varying degrees of objective treatment, on every hand.

The establishment of sound typologies also effects a very great saving in publication space by the use of simple name-references to those types already described. In Southwestern and Southeastern pottery reports, for example, the general recognition of many types has eliminated repetitive description on a very appreciable scale.

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[19] See Griffin, 1942, for a good example of discussion, description, and tentative identification of the kind necessitated by conditions.

The concept of the typological method has already been extended somewhat beyond the ceramic field through such terms as "Folsom Point," "Gypsum Point," "Lake Mohave Point," and the like. However, there has as yet been little attempt to formulate the complete inclusiveness of these terms, and until this is done, strict comparisons are difficult and precarious. There is a great need for more study of the variations which are to be included in these "types," although this is considerably hampered by their relative rarity and wide dispersion.

It appears to the writer that pending definition and common recognition of historically reliable types, the word "type" should be avoided as much as possible. It is perfectly easy and feasible to speak of "form," "shape," "style," or "these specimens," "this group," etc. in discussing any sort of artifact or part thereof. Suspected identity with recognized types can be discussed without confusing the issue with loose applications. Eventually "type" could be restricted to one definite meaning.

Greenman[20] has described a system which reflects dissatisfaction with the traditional approach to classification, and at the same time reveals the germ of a typology based on cultural association. Because of this conflict, his application of the term "type" is inconsistent. If he had not felt a certain obligation to begin with a typical symbolic outline, and then convert it according to experience with distributions, this ambiguity would have been avoided. The paper does, however, indicate that such dissatisfaction has been felt by some authorities for a considerable time.

Black and Weer[21] have suggested three concepts or stages in the classification of artifacts. They term these "geometric, morphological, and cultural forms." If I understand their argument, geometric forms are those which can be described by simple geometric terms; these artifacts may consist of a single shape or a combination of two or more simple shapes. The morphological and culture forms would consist of elaborations upon the simple "basic" forms which have special meanings in various culture settings.

Byers and Johnson[22] have also made an important step toward more realistic treatment of material. They demonstrate an unusual sense of obligation to the reader by explaining their position and method in considerable detail. Like Greenman's, their system of analysis arises from dissatisfaction with traditional classifications and incorporates distributional knowledge in the formation of types. Their Figure 9 is an example of such types, for there is no particular order in the sequence

[20] Greenman, 1929.
[21] Black and Weer, 1936.
[22] Byers and Johnson, 1940, esp. pp. 32–40.

of forms shown; in other words, they felt no compulsion to present the forms in any "logical" order, for each has a meaning of its own independently of the others. Their approach, adapted from Black and Weer,[22] retains such classificatory ideas as a search for characters of "basic importance"; in this case workmanship is used and the classes are "crude," "finished," and "exceptional." The term "type," say Byers and Johnson, "is intended to represent the perfect example, exhibiting all the characteristics which differentiate it from other types. It is the mean, falling between the extreme variations." While this interpretation of type may be questioned, their discussion is interesting and valuable.

In a short paper, Adams[24] has discussed the relative diagnostic value of certain types in different circumstances. This value is far from constant, for a given type may be "diagnostic" of a certain culture complex in one area, but too elusive or too general in another.

Probably the most important single paper yet to appear on typological methodology and its implications in terms of history and behavior is that of Rouse.[25] It includes careful definitions of terms such as "concept," "postulate," etc. incidental to the discussion of "type" and "mode," the basic tools for analysis. If anything, the work is overinvolved and rather wearyingly repetitive in its insistence on certain premises. In the present paper, my use of "feature" and "character" in regard to specimen and group description, although undefined, appear to be equivalent to Rouse's "attribute" and "mode."

CONCLUSIONS

Analysis of archaeological material has not been fully effective because of such assumptions as:

1. Arrangement for descriptive orderliness and symmetry is equivalent to analysis for the discovery of cultural relationships.
2. Any grouping in a classificatory outline is automatically a "type."
3. There are basic characters underlying the products of human workmanship which, if they can be discovered, will provide the means for more uniform and standardized classifications.

It is recommended that:

1. Outline systems of classification be abandoned for purposes of research in cultural relationships. (This does not preclude their usefulness for abbreviated cataloging description, note-taking, filing, etc.)
2. The typological concept exemplified by pottery research be pro-

[22] Black and Weer, 1936.
[24] Adams, 1940.
[25] See notes 3, 16, 18.

jected into other material categories; type descriptions likewise to be organized toward full range of variability and illustrated for maximum comparability.

3. All instances of the use of "type" in archaeology be viewed with reserve unless accompanied by full explanation of their method of determination.

BIBLIOGRAPHY

ADAMS, ROBERT MCCORMICK
1940. "Diagnostic Flint Points." AMERICAN ANTIQUITY, Vol. 6, pp. 72–75.

BLACK, GLENN A., AND PAUL WEER
1936. "A Proposed Terminology for Shape Classification of Artifacts." AMERICAN ANTIQUITY, Vol. 1, pp. 280–294.

BYERS, DOUGLAS S., AND FREDERICK JOHNSON
1940. *Two Sites on Martha's Vineyard.* Papers of the Robert S. Peabody Foundation for Archaeology, Vol. 1, No. 1.

COLE, FAY-COOPER, AND THORNE DEUEL
1937. *Rediscovering Illinois.* University of Chicago Press.

DEUEL, THORNE
N.D. "A Proposed Classification of Stone Projectile Points." Ms. dated 1927. Copy in Anthropology files, University of Texas.

FINKELSTEIN, J. J.
1937. "A Suggested Projectile-Point Classification." AMERICAN ANTIQUITY, Vol. 2, pp. 197–203.

FORD, JAMES A.
1938. "A Chronological Method Applicable to the Southeast." AMERICAN ANTIQUITY, Vol. 3, pp. 260–264.

FORD, JAMES A., AND GORDON F. WILLEY
1940. *Crooks Site, A Marksville Period Burial Mound in La Salle Parish, Louisiana.* Dept. of Conservation, Louisiana Geological Survey, Anthropological Study 3. New Orleans.

FOWKE, GERARD
1896. *Stone Art.* Bureau of American Ethnology, Thirteenth Annual Report.

GIFFORD, E. W.
1940. *Californian Bone Artifacts.* Anthropological Records, Vol. 3, No. 2. University of California Press.

GIFFORD, E. W., AND W. E. SCHENCK
1926. *The Archaeology of the Southern San Joaquin Valley, California.* University of California Publications in American Archaeology and Ethnology, Vol. 23, pp. 1–122.

GLADWIN, W., AND H. S. GLADWIN
1930*a*. *Some Southwestern Pottery Types. Series I.* Medallion Papers. Globe, Arizona.
1930*b*. *A Method for the Designation of Southwestern Pottery Types.* Medallion Papers. Globe, Arizona.
1931. *Some Southwestern Pottery Types. Series II.* Medallion Papers. Globe, Arizona.
1933. *Some Southwestern Pottery Types. Series III.* Medallion Papers. Globe, Arizona.

GLADWIN, H. S., E. W. HAURY, E. B. SAYLES, AND N. GLADWIN
1937. *Excavations at Snaketown, Vol. 1, Material Culture.* Medallion Papers, No. 24. Globe, Arizona.

GORODZOV, V. A.
1933. "The Typological Method in Archaeology." *American Anthropologist,* Vol. 35, pp. 95–103.

GREENMAN, E. F.
1929. "A Form for Collection Inventories." Bulletin of the National Research Council, No. 74, pp. 82–88.

GRIFFIN, JAMES B.
1942. "Adena Pottery." AMERICAN ANTIQUITY, Vol. 7, pp. 344–358.

HARGRAVE, L. L.
1937. *Guide to Forty Pottery Types from the Hopi Country and the San Francisco Mountains, Arizona.* Museum of Northern Arizona, Bulletin 11. Flagstaff.

HAWLEY, FLORENCE M.
1936. *Field Manual of Prehistoric Southwestern Pottery Types.* The University of New Mexico Bulletin, Anthropological Series, Vol. 1, No. 4.

KIDDER, A. V.
1932. *The Artifacts of Pecos.* Yale University Press. New Haven.

KLUCKHOHN, CLYDE
1939. "The Place of Theory in Anthropological Studies." *Philosophy of Science,* Vol. 6, No. 3, pp. 328–344.

LILLARD, J. B., R. F. HEIZER AND F. FENENGA
1939. *An Introduction to the Archaeology of Central California.* Sacramento Junior College, Dept. of Anthropology, Bulletin 2. Sacramento, California.

NELSON, N. C.
N.D. "Classification of Projectile Points." Ms. sent to Carl E. Guthe for Committee on State Archaeological Surveys, dated June 11, 1929. Copy in Anthropology files, University of Texas.

RAU, CHARLES
1876. *The Archaeological Collection of the United States National Museum, in Charge of the Smithsonian Institution, Washington, D. C.* Smithsonian Contributions to Knowledge, Vol. 22.

RENAUD, E. B.
1931. "Typology and Description of Projectile Points." Ms.
1934. *The First Thousand Yuma-Folsom Artifacts.* University of Denver, Dept. of Anthropology. Mimeographed.

ROUSE, IRVING
1939. *Prehistory in Haiti, A Study in Method.* Yale University Publications in Anthropology, No. 21.

STRONG, W. D.
1935. *An Introduction to Nebraska Archeology.* Smithsonian Miscellaneous Collections, Vol. 93, No. 10.

WILSON, THOMAS
1899. "Arrowpoints, Spearheads, and Knives of Prehistoric Times." United States National Museum, *Annual Report for 1897,* Pt. 1, pp. 811–988.

WISSLER, CLARK
1923. *Man and Culture.* New York.

The University of Texas
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COLLECTING AND PRESERVING BOTANICAL MATERIALS OF ARCHAEOLOGICAL INTEREST

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IN ARCHAEOLOGICAL sites plant remains are frequently encountered either as artifacts or as natural deposits. A study of such remains commonly yields much valuable information, not only for the archaeologist but for other investigators as well. Thus, the former vegetation of a region and its possible bearing upon the previously existing climate are often revealed. Both the botanist and the paleontologist are interested in the preservation of plant remains and the structural and chemical changes which they have undergone since their deposition or submergence. In addition, of course, the careful study of woody artifacts frequently affords significant information regarding the customs and practices of primitive peoples in working their materials. In order that the greatest value may be obtained from a study of botanical materials, however, it is essential that certain precautions and techniques be used in collecting and preserving them. Unfortunately, much botanical information available in an archaeological site is either discarded or overlooked in the process of digging and exposing the site.

Although certain basic principles for securing specimens in the field may seem self-evident, it is nevertheless desirable to emphasize them in a discussion devoted to techniques. The first of these principles is perhaps the simplest, though not always the easiest to apply, viz., removal of the material intact. This rule should govern not only the removal of woody remains from an excavation but also the collection of seeds, fibers, leaves, or any other definitely recognizable plant remnants. The identification of small fragments involves difficulties which often might have been obviated by the careful collection of larger specimens. Although attempts to collect intact samples of very soft or poorly preserved specimens are often nullified by the condition of the material, all such efforts are worthwhile because of the possible value of the specimens.

The second principle to be observed in collecting is likewise simple, though it is commonly overlooked in the interest or excitement of making "finds" in the field. It is merely the tabulation of data concerning the position of specimens in relation to other features of the site: the distance from the ground level, from the bottom of the excavation, or from any other arbitrary plane of reference. In the case of peat deposits or cuts in which other strata are exposed, it is essential that accurate data concerning the relation of the layers to each other be included. Samples of peat collected from a vertical exposure are usually worthless

unless their relative positions are precisely known. Efforts to date archaeological sites by a study of pollen contained in peat depend at the outset upon collection from different levels and upon reliable data concerning the relationships of the samples. In addition, all possible information concerning the nature of the medium surrounding botanical specimens should be recorded. The knowledge that the medium is sand, gravel, mud, silt or clay is often very useful in subsequent analysis of the material.

The third principle in collecting involves the adequate storage or preservation of the material pending its further examination. Details depend upon the nature of the specimens collected and the facilities available. In general, the purpose of preserving specimens is to prevent alteration or changes from their original condition. The various preservatives and methods of storage recommended for this purpose can be best described in reference to specific types of plant materials.

By way of summary, the basic rules for collecting may be stated as follows: (1) collection of intact specimens, or the largest possible fragments; (2) recording of accurate data regarding the position of specimens in the site and the nature of the medium in which they are found; and (3) adequate preservation or storage of the material collected.

In the following pages four types of plant remains are discussed, primarily in terms of the application of the principles enumerated. Some attention is given to the methods of examination in the laboratory to show how dependent the analyst is upon the field collector.

1. The importance of peat in studies of pollen, which have contributed so significantly to our knowledge of post-glacial climatic fluctuations and have provided a technique for dating archaeological sites, is too well known to require elaboration here.[1] Peat also contains innumerable remains of microscopic plants and animals which, though they have been studied less extensively than pollen, are of great significance in determining the physical and biological conditions at the time of deposition. The identity of these plants and animals may, for example, indicate whether the peat in question formed in salt, brackish, or fresh water and may permit other inferences to be drawn regarding the natural conditions which existed in the site or its immediate environs.

In collecting peat for microscopic examination the greatest care should be exercised to remove samples which have not been contaminated by fragments from other samples. If portions from several levels become mixed, differences in their composition may become confused. It is therefore necessary that a record be made concerning the position of each specimen removed. If it is not too large, a vertical column (or

[1] Godwin, 1934; Deevey, 1939; Eiseley, 1939.

core) of the peat can be removed and stored intact so that samples may be taken as needed. Unless the core shows a characteristic stratification, its upper and lower ends should be labeled to eliminate the danger of its being reversed.

Although this is not customary, peat is perhaps best stored moist or wet, before it has been allowed to dry. Drying causes contraction which draws the colloidal particles tightly together, so that deflocculation is required before the pollen can be examined. Storage in a five per cent solution of formalin in water is an excellent method of keeping the samples wet and in good condition, since formalin inhibits the growth of bacteria and fungi which attack the organic matter in unprotected moist peat. The core or individual specimen may be either thoroughly moistened with or submerged in this solution.

In the analysis of pollen in peat it is essential first to free the pollen grains from adhering particles, and frequently it is desirable to concentrate the pollen grains by separating them from other constituents of the peat. The various methods used to accomplish these purposes are not, in general, difficult.[2] Identification of the pollen grains, however, is a highly technical procedure and requires much experience and skill. A reference collection of the pollen grains of different species of native plants, particularly trees, should be prepared before efforts are made to identify fossil pollen.

2. Seeds and leaves are sometimes found in archaeological sites. The identification of seeds found associated with cooking implements is always of interest for the light it throws on the types of food used. Seeds and leaves often present difficulties to the collector, since they are likely to be poorly preserved and fragile. Hard, bony seeds and nuts are of course, occasionally found in excellent condition. The seeds, leaves, or other plant fragments should be carefully removed, freed from adhering material, if practicable, and placed in glass vials or other suitable containers. For seeds and fragile plant parts, storage in alcohol is excellent, since it both hardens and preserves the tissue. Ordinary denatured alcohol, preferably of a concentration of 70 per cent or greater, may be used for this purpose. It should be noted that unless seeds are fairly well preserved, it is often impossible to identify them.

It is sometimes possible to identify very small plant fragments (such as small seeds or fruits, portions of leaves, or the stems and rootlets of grasses), which have been embedded in baked clay or partially fired brick, by the use of special methods involving maceration of the matrix and separation of the plant debris.[3]

3. Wood is a third category of plant material commonly encountered

[2] Cain, 1939; Barghoorn and Bailey, 1940. [3] Darrah, 1938.

in an excavation or deposit of archaeological interest. The physical condition of wood after prolonged burial or submergence is remarkably variable, although the cause of this variation is but poorly understood. In general, wood which has been continuously submerged in fresh or salt water or in very wet mud, clay, or silt decomposes slowly, whereas wood buried in earth, sand or in a similar environment decomposes rapidly. The state of preservation in which wood is found is not, therefore, a reliable index of its age, unless the conditions of burial or submergence are known. Under similar environmental conditions, however, the degree of decomposition of similar types of wood will depend, in general, upon the length of time elapsing since their burial. Therefore, careful microscopic study of woody remains, correlated with observations on the environmental conditions, will be of much value in efforts to date such remains. When fragments of wood are unearthed, it is not sufficient merely to determine their botanical identity; much additional information may become available if they are studied more intensively.

Considerable care should always be taken in removing specimens of wood from the site. Every effort should be made to remove whole specimens, not only of artifacts, but of other woody remains as well. If bark is present on twigs, branches, or stakes, it is of advantage to keep it in place on the wood. If wood is excessively soft or crumbly, it is generally not profitable to collect specimens, since their altered physical condition makes identification very doubtful.

Perhaps the most important single precaution in collecting buried or submerged wood is to prevent drying of the specimens after their removal. The excessive contraction and warping which commonly accompany drying render the material useless or of limited value for further study. Certain of the dried wood specimens from the Boylston Street Fish Weir, found in Boston in 1939, were little more than caricatures of the originals; the tangential contraction of the air-dry wood was as much as 75 per cent in some instances.[4] For short-time storage, samples of wood may be kept under water, placed in moist sawdust or sphagnum moss, or wrapped in damp cloth. For long-time or permanent storage, the specimens may be placed in 70 per cent alcohol (or stronger) or in a five per cent formalin solution. After wood has been soaked in a formalin solution for a few days, the excess liquid may be drained off and the container sealed. Specimens treated in this way will be excellently preserved for an indefinite period. Removal of the excess liquid greatly reduces the weight of containers and lessens the problem of transporting or shipping specimens.

The identification of almost all woods—the exceptions are oak, beech, and a few other species—which are partially decomposed re-

[4] Bailey and Barghoorn, 1942.

quires microscopic examination. If the wood is very soft, it must be embedded in a firm matrix which will hold the tissue together while thin sections are cut. Paraffin and celloidin (parlodion) are the most commonly used materials for embedding plant tissues. The specimens are first dehydrated by successive treatments with alcohol and then slowly infiltrated so that the embedding medium completely permeates the tissue. Blocks of embedded material are trimmed, and thin sections are cut from them by the use of a sliding microtome. The thin sections may be studied under the microscope without further treatment, or they may be stained and mounted on slides for permanent reference or for purposes of photomicrography.

Firm, well-preserved specimens often can be cut directly without the necessity of embedding. It should be emphasized, however, that if the originally moist, soft specimens of wood are allowed to become dry and hard, the problems of identification and preparation for microscopic study are greatly increased.

Special methods of collecting and storing wood which is found in a dry state or which has undergone but slight change from its original physical condition are not necessary. Such specimens may be kept dry, since they differ but slightly from normal, unaltered wood.

4. The fourth and last category of botanical specimens to be considered is wood charcoal. Charcoal is common in most sites and comprises an especially large proportion of the archaeological materials in New England sites. The identification of these charred remains is of considerable interest. It is desirable that care be taken to remove reasonably large fragments, since it is almost, if not quite, impossible to identify small ones. As with specimens of wood, charcoal should be stored moist, for drying causes cracks and minute cleavage planes along which splits occur when the material is remoistened. Although storage for an indefinite period in damp sawdust or peat moss is possible, the use of an alcohol solution is perhaps preferable. Fragments found dry can be kept intact by carefully packing them with absorbent cotton in small wooden or paper boxes.

Experience in the preparation of blocks of charcoal for identification has shown that a rather large amount of the dark-colored substances (other than carbon) in all but the most charred pieces can be extracted by suitable bleaching methods. One method which the author has successfully used consists of alternate, prolonged treatments with strong chlorine water and dilute aqueous solution of caustic soda. The bleaching process often results in changing the color of the charcoal from jet black to dark velvety brown. Bleached specimens are more easily identified, since removal of the excess coloring substances makes more apparent the characteristic structure of the wood. The bleached char-

coal is washed in water, dehydrated in alcohol and embedded in paraffin for sectioning. Except for the bleaching process, the steps in preparing charcoal for identification are similar to those required for wood. The actual identification is, however, a more difficult task, since charring often obscures or even obliterates the structural pattern of the wood.

Although the foregoing discussion has been devoted to four selected types of plant materials, it should be emphasized that the same general principles of collecting and storage apply to all plant materials found in archaeological sites. Special laboratory techniques for the examination and microscopic study of plant remains are often necessitated by the nature of the specimens. However, the field archaeologist and the botanist may derive much mutual benefit by coordinating their techniques of collecting with those employed in subsequent study of the materials. This cooperation should, in turn, make more apparent to both the amateur and professional archaeologist the relationship between certain phases of botany and archaeology.

BIBLIOGRAPHY

BAILEY, I. W., AND E. S. BARGHOORN
1942. "Identification and Physical Condition of the Stakes and Wattles from the Fishweir." In Frederick Johnson et al., *The Boylston Street Fishweir*. Papers of the Robert S. Peabody Foundation for Archaeology, Vol. 2. Andover.

BARGHOORN, E. S., AND I. W. BAILEY
1940. "A Useful Method for the Study of Pollen in Peat." *Ecology*, Vol. 21, pp. 513–514.

CAIN, S. A.
1939. "Pollen Analysis as a Paleoecological Research Method." *Botanical Review*, Vol. 5, pp. 627–654.

DARRAH, W. C.
1938. "Technical Contributions to the Study of Archaeological Materials." AMERICAN ANTIQUITY, Vol. 3, pp. 269–270.

DEEVEY, E.
1939. "Studies on Connecticut Lake Sediments. I. A Postglacial Climatic Chronology for Southern New England." *American Journal of Science*, Vol. 237, pp. 691–724.

EISELEY, L. C.
1939. "Pollen Analysis and its Bearing on American Prehistory: a Critique." AMERICAN ANTIQUITY, Vol. 5, pp. 115–139.

GODWIN, H.
1934. "Pollen Analysis. An Outline of the Problems and Potentialities of the Method." *New Phytologist*, Vol. 33, pp. 278–305; 325–338.

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JARITAS ROCK SHELTER, NORTHEASTERN NEW MEXICO

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THE EXISTENCE of this rock shelter was first brought to attention through a gift, which included two woven yucca sandals, made to the Laboratory of Anthropology by Mr. Arthur Bibo. A visit to the site from which the specimens were obtained having revealed a promising situation, plans were laid for excavation. Investigation here was deemed particularly important since no dry cave material had been previously reported from this section. Mr. Ben Florsheim, the owner of the property on which the shelter was located, readily granted permission to carry on the projected work. Preliminary preparation having been made, the writer, assisted by Mr. Stanley Stubbs of the Laboratory staff, began actual operations on November 17th, 1932.

The shelter is situated high in the canyon wall, on the eastern side of the Canadian River, in this locality more often known as the Red, about fifteen miles in an easterly direction from Springer, Colfax County. The opening, which faced east, was found to have a greatest length of slightly over 35 feet and a height above the general floor level of from 6 feet at the south end to 15 feet near the north end. The greater height at the north was the result of a fall of rock from the roof at that point. The detritus resulting from the fall had caused the formation of a sort of platform beneath it. The greatest depth of the shelter, measured from the outer edge of the overhang, was about 22 feet. The deposit of occupational debris was comparatively shallow, averaging only about a foot at the north end of the shelter and approximately 2 feet in the southern half.

The excavation of the deeper deposit, which lay upon a fairly even floor, was started with the establishment of a face across the entire front. This face was maintained as work progressed toward the rear, but it proved less practicable in dealing with the debris on the platform, because of the pockets formed by the many crevices and irregularities in the fallen rock.

No well-marked levels of occupation could be distinguished. Ashes and charcoal, marking the locations of scattered unspecialized hearths, were found at all depths. This was equally true for occasional deposits of dried grass, which may have served as beds.

Objects of material culture were comparatively scarce and, with few exceptions, proved of little value in the establishment of any definite connection with cultures known in the Southwest at this time. Neither has it been possible to prove a homogeneity of culture for all parts of

the shelter. However, certain analogies, to which attention will be directed when the objects secured are described later in this paper, were noted.

The only example of an approach to a structural treatment was uncovered eight inches beneath the surface and near the center of the southern, or less elevated, section of the shelter. This consisted of two unworked stone slabs, roughly rectangular in shape and approximately 18 inches in both dimensions, which had been sunk parallel to one another in the underlying debris. They formed two sides of a small bin-like receptacle with open ends. Sections of pine bark had been laid to form a floor extending the full length of the slabs, to a width of sixteen inches. It was empty when found.

MATERIAL CULTURE

Objects of Pecked and Ground Stone. One complete sandstone metate (20×30 inches), having a shallow oval depression pecked on one surface, and the fragments of another were found close to floor level, just south of the southern end of the platform formed from fallen roof material. Neither shows extensive wear. A similar pecked depression on a massive block of sandstone immediately south of the cave's entrance also appears to have been used for milling. Four one-hand manos, all adapted from conveniently shaped cobbles, show the effects of use in some such activity.

Objects of Chipped Stone. A large number of spalls, apparently hastily adapted for temporary use in cutting or scraping, occurred throughout all parts of the occupational deposit. Aside from these, only six specimens of chipped stone were obtained which could be considered as fully shaped implements. With these few exceptions, all of which show a retouch by pressure, flaking was effected almost entirely by the percussion method. Only five of all the chipped implements were made from material other than a very hard, dense, and finely laminated cryptocrystalline rock, varying in color from dark gray to almost black.

Two small projectile points with lengths of 1 inch and ¾ inch, respectively, differ considerably from one another in form but are made from the same dark-colored rock usually employed for the less specialized implements. These were found within the entrance of the shelter. Another, smaller, point of pinkish chert, ⅝ inch long, was recovered from interior occupational debris, still bound by sinew to a 3-inch section of slender wooden foreshaft.

A well made snub-nosed scraper, discovered within the cave opening, measures 1¼ inches in length. It was fashioned from a substance resembling jasper. The point of a knife-like implement and a side-scraper,

[MERA] PLATE XXX

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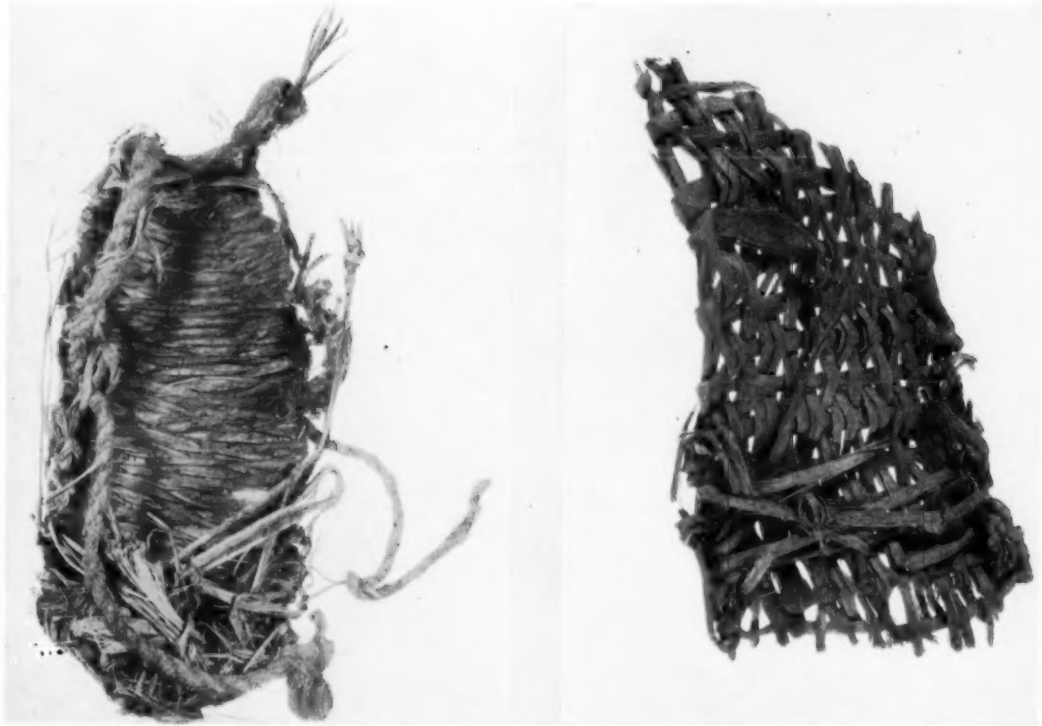
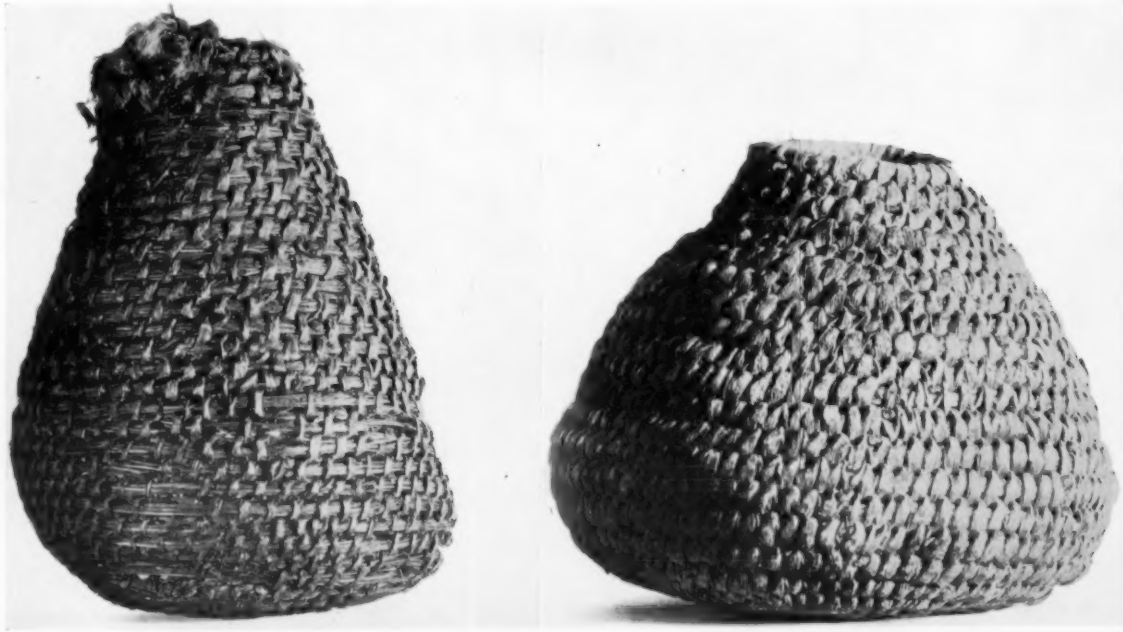
Specimens from Jaritas rock shelter. *Upper*, rear part of three-warp sandal. *Lower*, fiber "sock" in situ on sandal.



Specimens from Jaritas rock sheter. *Left*, sandal with cord tie. *Right*, fragment of checker weave.

Specimens from Jaritas rock shelter. *Left*, sandal with cord tie. *Right*, fragment of checker weave.



Baskets from Jaritas rock shelter. *Left*, lateral half of charred basket. *Right*, conoidal basket.

3¼ inches long, of the same dark-colored rock, were secured from interior deposits.

Objects of Wood. Three items alone deserve attention among an otherwise miscellaneous lot of sticks and wooden fragments. These are two drills which were used to produce fire by friction in a hearth with which they were associated; a planting and digging stick 26 inches long and ⅝ inch in diameter, which is tapered smoothly to a point at one end and nicely rounded at the other; and a short, more bluntly pointed stick, 10 inches in length and ⅝ inch in diamter, which shows the effects of heavy pounding at the opposite end. Many similar sticks, the function of which is unknown at present, have been secured from caves in the Guadalupe Mountains of southeastern New Mexico.

Objects of Bone. All bone objects, except one, were found in interior occupational debris. The exception is an awl made from a piece split from a section of antler. One end has been tapered to a short acute point only ¾ of an inch long. This was a surface find in the vestibule of the shelter. Other artifacts in this class are: a tubular bead of bird bone, ¾ inch long; another section of bird bone, 1½ inches long, which bears an annular groove and was evidently in process of being converted into a similar object; and a fragment, 1½ inches long, of an awl with the point missing, made from a splinter from the shaft of a long bone of some large mammal.

Sandals, Basketry, Cordage, etc. Three fairly well-preserved sandals, woven from a species of narrow-leaved yucca, represent the total finds of this class of artifact. One is unique, in so far as could be learned, in having a foundation composed of three groups of warp elements. After the weaving had been completed, all but one of the warp elements in the three groups were gathered together in the rear, where they were tied by single knots to one of their number selected for the purpose. The loose ends of all were then carried onto the upper surface of the sandal for a distance of about three inches (Pl. XXX, *upper*). A twined technique, employing whole yucca leaves, was used in weaving. The specimen, from which a section of the distal end is missing, has a length of 5¼ inches. As the bundle of warp elements which were folded onto the upper surface would have caused considerable discomfort to the wearer, it is believed that a fiber "sock," similar to those to be described presently, was worn with this type of sandal.

The remaining two sandals have a four-warp foundation arrangement, but otherwise the materials and weave are the same as those described for the foregoing specimen. In the larger of these two, which has a length of 10½ inches, the ends of warp elements left at the heel when the weaving was finished were also folded back onto the heel.

The method of handling this feature in the remaining example, which has a length of 9½ inches, is not clear, owing to its poor condition.

Tie-strings of whole yucca leaves seem to have been the usual means of fastening the sandals. Only on the shorter of the two four-warp type specimens has anything else been used, and then only in a supplementary fashion. In this case a length of two-ply fiber rope connected some of the tie-strings (P. XXXI, *left*). The exact method cannot be determined, as the attachments between the sandal and rope have disappeared, leaving only stubs on the former and the remains of loops on the latter. It has been impossible to determine whether there was some customary arrangement of these appendages, but from the meager evidence remaining there appears to have been considerable latitude in this respect.

Of considerable interest is the evidence that "socks" made of shredded yucca fiber were worn with the sandals. Examples of these socks were found accompanying both of the four-warp sandals, with the better preserved occurring in situ on the larger of the two. It consists of a layer of fibrous material about ¼ inch thick, which not only protected the sole from the rough surface of the sandal, but was also carried up over the toes to about the height of the instep (Pl. XXX, *lower*). Individual strands of this fibrous material tend to parallel the long axis of the foot. A large bundle of prepared but unused fiber of this sort was discovered concealed in a cavity between the rocks of the platform. A possible reason for the use of such a "sock" was mentioned in describing the three-warp specimen.

Another oddity is the superposition of the rear portion of an apparently discarded sandal to reinforce a worn section of heel in another.

All of these sandals are comparable in only a very general way with others found in cave sites of the Guadalupe-Sacramento Mountain district in southeastern New Mexico.[1] This region, lying some 250 miles to the south, is the nearest known provenience of technically related forms. Although four-warp sandals in twined weaving and employing narrow leaved yucca are common to both localities, there are some differences in detail. This is particularly noticeable in the treatment of the excess lengths of warp elements at the heel. In the south, these are merely cut off and allowed to extend backward to form a "fish tail," while in the northern site they are, as previously described, folded forward onto the sandal proper. Another trait, the fiber "sock," appears to be entirely absent in the south.

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[1] H. P. Mera, *Reconnaissance and Excavation in Southeastern New Mexico*. Memoirs of the American Anthropological Association, No. 51, 1938.

The two coiled baskets found in the shelter also demonstrate features which, at least superficially, relate them to certain southern forms. More specifically, these features are bundle foundations and a tendency to space stitches so widely that the foundation is prominently visible. Interlocking stitching was employed and stitch splitting is of very common occurrence, though this appears to be purely incidental.

Of the two specimens secured, all that remains of one is the lateral half of a conoidal bottle-shaped receptacle, 8¼ inches in height (Pl. XXXII, *left*). The character of weave is rather coarse for a basket of its size; it has only four coils and three stitches to the inch. It had been filled with shelled corn, with a bit of skin fastened over the mouth, and buried on its side in occupational debris. Later the surface of this deposit had taken fire, resulting in the destruction of the uppermost side of the basket, and the charring of the remainder and its contents.

The other, also conoidally bottle-shaped, was more squatty, measuring but 4½ inches in height (Pl. XXXII, *right*). It contained a worked and polished stone, 3⅜ inches in length, of a fine-grained greenish material and a small piece of buckskin in which a naturally polished white pebble, ¾ inch long, was wrapped and secured with a length of yucca fiber. The larger greenish stone shows numerous fine scratches resulting from abrasion during an attempt at some slight shaping and polishing. This basket was found concealed in a crevice among the rocks that form the platform section of the shelter. In this instance a somewhat better quality of weaving is evident, as there were four coils and six stitches to the inch. Both baskets have foundation coils composed of grass stems, and the sewing was done with strips of yucca leaf.

Another example of weaving, in which a simple open-work checker weave was used, is a strip measuring 6½ inches long by 3½ inches in width. As it is broken off at either end, its original length is conjectural. All the material employed was yucca. No use for this object has been determined, but it does not seem to have been constructed strongly enough to have withstood any severe usage (Pl. XXXI, *right*).

Three pieces of cordage were secured. One of these has been previously mentioned during the discussion of sandals. This specimen has a total length of 31 inches and an average diameter of ¼ inch. The material is a rather soft, finely prepared yucca fiber. It is composed of two members twisted together.

Another length of two-ply cord, 15 inches long and $\frac{3}{32}$ inch in diameter, spun from yucca fiber, appears to be somewhat harder and more springy than the previously mentioned specimen. This is probably the result of tighter twisting. Another piece, similar in all respects, is 10½ inches in length and a little less than $\frac{1}{16}$ inch in diameter. It is believed

that this bit of cord was once part of a necklace, as it was found strung with seven cane beads, which have an average length of ½ inch.

Other objects under this general heading are three yucca leaves, free at both ends and braided for a length of 4½ inches, and several other lots of yucca leaves knotted together in no definite pattern, which are believed to have been used as temporary burden carriers.

Like some of the other objects previously noted, cordage from the shelter also bears a resemblance to the kind which is standard in the cave sites of the Guadalupe-Sacramento region, in that both are basically of the two-ply type and employ prepared yucca fiber. Still another analogy with the south may be seen in the use of various arrangements of yucca leaves knotted together and doubtless used in transporting unwieldy loads.

Miscellaneous Objects. A number of objects having no particular significance and meriting nothing more than mere listing are: many unworked pieces of cane, a nodular concretion, an unshaped piece of transparent selenite, bits of gourd rind, a fragment of fresh-water mussel shell, and a string-marked potsherd.

The last item, since it was the only sherd found in the course of a diligent search, may have been picked up at a distance and brought into the shelter as a curiosity. This deduction seems reasonable, since all the sites yielding this type of pottery appear to be confined to the Canadian River drainage and do not occur west of Logan, New Mexico, a distance of approximately one hundred miles east of the shelter.

Food. That corn was used by people who formerly occupied the cave is attested, not only by the cache of charred kernels stored in a basket, but by the presence of a number of cobs and husks scattered throughout the rubbish. However, if the amount of food bones secured be compared to remains of that cereal, corn might at first sight appear to have been of minor importance in the diet. But there should also be considered the possibility of a seasonal occupation of the shelter. If the small store of charred corn be taken to represent a reserve held for seed, an agricultural phase of existence elsewhere may, with some reason, be assumed. Hence, the rock shelter may have been occupied principally during a period when hunting provided the principal means of subsistence.

The following is a list of identifiable food bones:[2]

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[2] Identification by Dr. William H. Burt, Curator of Mammals, Museum of Zoology, University of Michigan.

Mule deer (*Odocoileus hemionus*)
Cones deer (*Odocoileus conesi*)
Bison or domestic cattle
Bobcat (*Lynx* sp.)
Jack-rabbit (*Lepus* sp.)
Tree squirrel (*Sciurus* sp.)
Badger (*Taxidea taxus*)
Porcupine (*Erethizon* sp.)
Prairie-dog (*Cynoniys* sp.)
Cottontail rabbit (*Sylvilagus* sp.)
Many unidentifiable bird bones

Bones occurred in both a calcined and an unburned state. Many long bones appear to have been split to obtain the marrow.

REMARKS

Although a few of the objects of material culture appear in some respects to be related technically to specimens from the Guadalupe-Sacramento region, yet the similarities are of so general a nature that it is not wise to argue at this time for any direct relationship.

The only clue which might indicate age is so inconclusive that it is mentioned with considerable hesitation, and merely as a matter of record. This is the presence of a single cord-textured sherd. Pottery of this sort is known to have been made up to the beginning of the fifteenth century. This statement is based on the finding of intrusive sherds of pueblo pottery, for which a dating had already been worked out by dendrochronology, in a late site containing the string-marked type on the Canadian River in western Texas. However, it must be also pointed out that the sherd from the shelter could as well have been carried in at any time subsequent to that date.

Since the continuation of work on this problem undertaken by Dr. E. T. Hall, Jr., research associate, has been interrupted by the war, this preliminary report is being made in order that the new cultural manifestation revealed in the Jaritas rock shelter may become a matter of record.

Laboratory of Anthropology
Santa Fe, New Mexico
May, 1942

ACCULTURATION, A NEW APPROACH TO THE IROQUOIAN PROBLEM*

BERTRAM S. KRAUS

INTRODUCTION

THIS paper is a plea for the complete reworking of the Iroquoian material, archaeological and historical, from the point of view of acculturation. The writer is not the first to make this plea. Both Fenton and Hunt have pointed out the necessity of reworking the source material for Iroquoian history; Fenton regards the 400 years of contact between Iroquois and white and between Iroquois and Algonkian as an excellent source "for an acculturation study showing the effects of the interaction of Indian and White culture, the interaction of Indian and Indian . . . and the adjustment of culture to environment."[1]

Little has been done with respect to the Iroquois in the study of acculturation from the written records. No attempts have been made to study specifically the effect of white contact upon the hitherto unadulterated Indian culture. True, in the field of prehistory, the archaeologist has, in some cases, been able to note the impacts of various Indian cultures upon others and to study the changes in material culture that ensued. But the archaeologist stops where the historian and ethnologist begin and the task of following a prehistoric Iroquoian culture through into the historic period has been largely left undone. Wintemberg has examined a number of prehistoric "Iroquoian" and "Algonkian" sites and, in his description of the archaeological material, has drawn upon early documentary sources for substantiating evidence and for greater fullness of detail, but he has not gone analytically into the problem of cultural change. Kinietz has conveniently presented for one Iroquoian group—the Hurons—a mass of ethnographic data culled from the documentary sources, but without regard to time sequence within the historic period or the implications for acculturation to be found therein.[2]

The task of making an acculturation study of the Iroquois from the prehistoric through the historic periods is a huge one and presents many difficulties. The results, however, may well throw needed light not only upon many special problems in the Iroquoian field but also upon certain phenomena of acculturation itself. This brings us to the necessity of

* The writer gratefully acknowledges his indebtedness to Dr. James B. Griffin, Douglas S. Byers, Dr. William N. Fenton, and Dr. Fred Eggan, for many helpful suggestions and stimulating expressions of opinion.

[1] Fenton, 1940, p. 166.

[2] Kinietz, 1940, pp. 1–160.

defining terms; a fact in itself indicative of the general disagreement among scholars even as to nomenclature.

As to acculturation, there is no real agreement on the precise definition of this word. Where there is agreement on definition there will usually be utmost confusion as to the aspects and processes of acculturation. Redfield, Linton, and Herskovits have set up an "Outline for a Report on Acculturation," but this applies to a living tribe and the difficulties in fulfilling its requirements are more than doubled when an attempt is made to apply its criteria to an extinct people. On the other hand, what we lose in range of data we gain in perspective when working solely in archaeological and historical horizons. Processes that have an undoubted effect on the whole problem of culture change, i.e., the psychological processes, both social and individual, are perforce eliminated from our field of observation. But since these forces can not yet be properly evaluated as to their effect on the acculturation process, perhaps their total absence from the picture will afford a clearer picture of the facts of culture change. Perhaps also a lack of compendency in our final picture of Iroquoian acculturation may tacitly imply the missing interplay of psychological processes and thus delimit their proper sphere—but this is admittedly conjecture at this point.

If we employ the definition of the sub-committee on acculturation appointed by the Social Science Research Council in 1935—"Acculturation comprehends those phenomena which result when groups of individuals having different cultures come into continuous first hand contact, with subsequent changes in the original culture patterns of either or both groups"[3]—then we can properly study only certain phases of acculturation. These would include the aboriginal community mainly in its material cultural aspects, influence from other aboriginal groups, the contact continuum, the noncultural results of contact, limited phases of the acculturation process, and certain aspects of the resultant community. Other phases of acculturation, such as most aspects of the acculturation process, individual and social psychological factors and effects, and certain individual and social aspects of the culture continuum, necessarily lie beyond our reach.

Even at best our sources of information are limited, and they are seldom "at best." We can reasonably hope to know something about: (1) the native culture at the pre-contact level, (2) the surrounding contemporary aboriginal cultures and their influence on our particular native culture, (3) the various elements of the contact continuum, (4) the "non-cultural" results of contact, (5) the changes in culture through acceptance of new or elimination of old culture elements, and

[3] Redfield, Linton, and Herskovits, 1936, pp. 149–152.

(6) the total effect on the group of contact and resultant change. Without this minimum of data we can hardly hope to accomplish much in studying acculturation as here defined, hence our first step is obvious; we must survey all available material pertaining to the specific Iroquoian society chosen for study and determine whether it can satisfy the conditions stated above as prerequisite. In addition, we must have sufficient data for the contemporary aboriginal contact cultures, as well as for the later white contact culture.

The initial survey of material involves a further difficulty—the careful establishment of the validity of our data at every point. Thus, if we set forth a picture of the native culture at the prehistoric level, we must be prepared to demonstrate that this *was* the culture of the later historic group. The contemporaneity of the surrounding aboriginal cultures must be proven before we can postulate their influences on our native group. And we must certainly establish the duration, nature, and intensity of white contact before we can gauge its effects. To study the effects of contact presupposes that we have adequate data for the native culture at one or more stages during the contact continuum. It will be apparent that a study of certain phases of the acculturation of an aboriginal group from earliest times up to and through the historic era must rely upon three disciplines—archaeology, history, and "historical" ethnography.

Further, in this paper the designation of cultures by linguistic or political terminology will be studiously avoided except in those cases where it can be demonstrated beyond a reasonable doubt that identity is established. Thus, if our historical sources describe a contact period village of Seneca Indians, and if a site discovered on the precise spot indicated by the historical account yields white trade goods plus native material almost identical to that from other sites definitely ascribed to Iroquoian tribes, *only then* can we feel safe in calling it an historic Seneca site. When a cultural context fails to reveal signs of white contact, but shows a high degree of similarity in cultural traits—belongs to the same focus—and close spatial relationship with identifiable contact period sites, we may logically infer political identity and speak, with reservations, of a prehistoric "Seneca" or "Neutral" site.

We should guard strongly against the use of such terms as "Seneca culture," "Iroquoian culture," and "Algonkian culture" and its subsequent implications. The term "Iroquoian" refers to peoples speaking dialects of the Iroquoian linguistic stock. These include such groups as the Cherokee, Huron, and Susquehanna, whose known cultural manifestations hardly resemble each other. The same can be said of the term "Algonkian." Names like "Seneca," "Huron," "Mohawk," and "Neu-

tral" are properly used to designate political entities only. It has not been established on purely archaeological grounds that the cultural remains of the political entities indicated by these terms are distinguishable. In my opinion it is improbable that archaeology will ever reach the point where it can assign cultures to historic groups entirely without the corroboration of historic and ethnographic data. Probably we would be more consistent with the general trend in American archaeology today if we limited our use of purely political or purely linguistic terminology to cultures (sites) whose political or linguistic affiliations can be proven, and described others in the prevailing taxonomic terms. In this way we might avoid building up our acculturation material upon premises that future work may sweep away.

If our specific interest is in the cultural changes brought about by the impact of white culture upon native culture, rather than by native upon native, our dependence is of a two-fold nature. On the one hand, we must rely solely upon archaeological discoveries and interpretations; on the other, we must have the support of historic and ethnographic as well as archaeological data. The former type of data presents but a fraction of the total material culture and a still smaller fraction of the total culture, material and non-material. The latter type will furnish us with cultural evidence which is more fully documented but of a nature fundamentally different from the purely archaeological evidence. Since an acculturation study involves the comparison of like traits and complexes, the great bulk of our evidence is useless in this respect. We cannot compare prehistoric pottery with historic kinship terminology and arrive at acculturation phenomena. For this reason the cultural bridge that we can attempt to throw across the gap that separates the prehistoric from the historic will necessarily be frail.

It is by now quite evident that an acculturation study of any Iroquoian tribe implies sufficient data of a particular type, long and careful research, and first-class scholarship. The balance of this paper will be devoted merely to the initial step discussed on page 304—the survey of available material on a particular Iroquoian tribe to determine whether it fulfills the requirements for an acculturation study, as those requirements have already been defined.

We have chosen as our "subject" the Neutral tribe of southwestern Ontario. Admittedly they, of all the Iroquoian tribes, would appear to offer the least promise for study of culture change, but we are not in this paper studying culture change. We intend simply to suggest a way of approaching culture from a diachronic instead of the usual synchronic point of view, and to illustrate the initial step in this approach. We shall point out rather than solve.

Our problem can now be set up. We are interested specifically in the effects of white contact upon the culture of the Neutral Iroquois. Our first step is to determine if there is enough evidence available to furnish answers to the following questions:

1. What was the nature of the pre-contact culture of the Neutrals?
2. Was there actual white-Neutral contact? If so, of what nature, intensity, and duration was it?
3. What was the effect of this contact upon the culture of the Neutrals, and upon the Neutral tribe itself as a political entity?

PRE-CONTACT CULTURE OF THE NEUTRALS

The Neutral Nation is first mentioned historically in 1615 by Champlain[4] and last mentioned as a tribal entity in 1653.[5] During this period the Neutrals occupied a well defined territory—the peninsula of southwestern Ontario, bounded on the south by Lake Erie, on the west by Lake St. Clair, on the east by the Niagara River, and on the north by a roughly drawn line from Goderich on Lake Huron to Oakville, a few miles south of Toronto. North of the Neutral country were the territories of the Tionontati or Tobacco Nation and the Hurons. All three groups spoke dialects of the Iroquoian linguistic stock and so are included under the designation of Iroquoian peoples.

Archaeologically it has been established that manifestations of the Woodland pattern and of a mixed Woodland-Mississippi type of culture are to be found within the territory of the historic Neutrals. As yet there has been found no single site showing components of both types in stratigraphic arrangement, but the evidence seems clear that the Woodland manifestations represent an earlier, the hybrid manifestations a more recent, culture horizon. This seems to correspond somewhat to the situation in New York State. Here Ritchie recognizes an Owasco aspect of Woodland which antedates the cultural manifestations of the historic Iroquoian peoples. The latter he groups into an "Iroquoian aspect." There can be little doubt of this particular temporal sequence in New York State. What may be open to question is the identification of the Owasco cultural material as Algonkian. The Iroquoian aspect, being composed of half Woodland, half Mississippian traits, is placed by Ritchie in the Upper Mississippi phase of the Mississippi pattern on more or less arbitrary grounds.[6] Assignment of sites of the Iroquois aspect to the Iroquoian people of New York State rests upon reasonably safe ground, since there is a continuation in the same area of much the same cultural traits from the prehistoric into the historic horizon.

[4] Champlain, 1922–36, p. 122. [5] Thwaites, 1896–1901, Vol. 38, pp. 181, 294.
[6] For the New York classification see Ritchie, 1938, pp. 98–100.

In Ontario, the home of the historic Neutrals, the identity of archaeological materials is less certain. We are dependent here chiefly upon the careful work of Wintemberg, who distinguishes three prehistoric "stages" or "periods of development": an archaic, a transitional, and a late pre-European. All three stages he identifies with the Neutral peoples. He places the Lawson site in the late pre-European stage of development and describes the Uren site as occupied by the "earliest Neutral, perhaps, to arrive in this region" and hence an archaic site. Three "presumed Neutral" sites in Brant and Elgin counties, Ontario, appear to belong to the middle or transitional stage.[7] Since Wintemberg remarks that both the archaic Uren site and the late pre-European Lawson site "are nearly on the same plane culturally," except for certain distinctive differences in pottery pipes and pottery decoration,[8] we might wonder upon what grounds he sets up a middle or transitional stage—but these will soon become apparent.

Fundamentally, the culture of the Lawson people is much like that of the Uren group, but there are some important differences—differences which seem to indicate the ancestral relationship of the latter to the former. The Lawsonites erected their village on a site naturally protected by an elevation of land and the confluence of two streams. In addition, they raised earthworks and constructed palisades that resemble in some features those of northern Ohio and western New York. They were much more extensive agriculturalists than the Uren people, raising several varieties of corn and beans, and they supplemented this with acorns, wild plums, and hickory and butternuts. Besides the game and fish that the Uren group obtained, the Lawsonites caught also the wapiti, caribou, skunk, fisher, mallard, crane, merganser, kingfisher, woodpecker, hawk, buffalo fish, mullet, bass, dogfish, sucker, and salmon. They made some limited use of copper, employed iron pyrites perhaps for fire-making, and made some artifacts of jasper—none of these materials appearing in the Uren site.

The Lawsonites, like the Uren people, lacked fish hooks, but they, on the contrary, had netsinkers, testifying to their use of nets to catch fish. On the whole, there is a greater profusion of stone implements on the Lawson site, though for the most part they are of types similar to those of the Uren site and show little or no improvement. They include flat stone anvils, adzes, large numbers of small abrading stones, pitted and unpitted hammerstones, scraper blades, perforated pebble pendants, a few ungrooved stone axes, small stone mortars, and crude drill points. Both sites show leaf-shaped, triangular, and notched projectile points. In addition, the Uren site yielded three stemmed points. On

[7] Wintemberg, 1931, p. 66; 1939, p. 60; 1928*b*, p. 50. [8] *Ibid.*, p. 51.

both sites, triangular points are predominant, notched are next, and leaf-shaped are rare. At the Lawson site, the points, especially the triangular ones, are generally smaller and better chipped.

In bone work, each site has distinguishing characteristics, although they have a number of common features. Both reveal worked beaver incisor teeth, antler flaking tools, large quantities of bone awls, one or two antler combs and bone needles, a few large bone tubes, a thin bone possibly used as a wristlet, hollow bird bone beads, and perforated plastrons and carapaces of turtles. Seven bone traits are peculiar to the Uren site. They are projectile points, a unilaterally barbed harpoon point, deer metatarsus beaming tools, slender bone pins, bird bone whistle, worked deer phalanges possibly for the cup and pin game, and a broken, partly polished mink mandible. Peculiar to the Lawson site are a deer scapula polished at the constricted end, a conical antler point, antler tines with tips ground to wedge shape, pierced deer and bear phalanges possibly used as beads, perforated canine teeth, and perforated and incised human skull gorgets.

Thus far, in our comparison, the differences between the two cultural manifestations seem to be largely a matter of quantity rather than of kind, or even of typology. Those features that are exclusive to either site generally occur in such small numbers that they form a poor basis for cultural differentiation. The occurrence of 120 storage pits, deeper refuse deposits, greater varieties and quantities of game, fish, and grain, and strong fortifications, argues for a richer and more secure life at the Lawson site.

It is in regard to pottery and pipes that really significant cultural differences occur. Uren pottery most commonly has round bottoms, globular bodies, slightly constricted necks, flaring mouths, and more or less incurved or rolled rims. On some cruder and smaller specimens the walls rise nearly perpendicularly, and the rims are either slightly incurved or slightly everted. The rims on a few pots are smaller in circumference than the globular body and rise more or less vertically from the shoulder. One pot has a pitcher-like lip—a feature characteristic of pottery of the historic Iroquois in New York. Lawson pottery has a greater variety of shapes, such as cup-like, bell-shaped with slightly flaring rims, globular with constricted neck and flaring rim, and, most commonly, globular with constricted neck and overhanging cornice-like collars. Pitcher-like lips occurred on forty-eight rims. Rim castellations are common. The Uren pottery shapes seem predominantly Woodland with a faint incipient "Iroquoian" trend. Lawson pottery shapes strongly suggest those of the historic Iroquois but seem to have "not

quite arrived." They resemble quite closely the material from the Ripley site.[9] On the other hand, certain characteristic Woodland shapes are still met with on the site.[10]

Decoration of Uren pottery is mainly geometric and consists of notches, round and oval pits, irregular or angular depressions, short vertical and oblique lines, crescentic depressions, horizontal lines, curved lines, circles, and nodes. Occasionally three circles are found, usually at castellation points, perhaps to represent the human face. Usually the decoration is obtained by the use of horizontal lines alone or short oblique lines alone. The chevron design nowhere occurs. A majority of the pots are scarified; some are cord-marked all over. The tempering material is crushed stone.

The Lawson pots are more complex in their decorative patterns. The chevron design is the most common. The decorative elements employed are much the same as those on the Uren pottery, except that nodes are missing. Furthermore, two or more elements are much more commonly combined on the same pot. There is very little scarification of the surface, and cord-marking or roughening is infrequent. Usually the surfaces are smoothed. The tempering material is crushed stone, although one specimen with shell temper occurs. The Lawson pottery seldom has decoration on the lip edge or on the inside surface of the rim, as is frequently the case with Uren pottery.

Here again the general impression is one of strong Woodland elements in the pottery of both sites, with a definite trend in the case of the Lawson site toward those characteristics which are commonly thought of as Iroquoian.

There was only one stone pipe found on the Uren site. Both bowl and stem are square in cross-section. Twenty-five clay pipes came from the same site, however. They have simple cylindrical bowls, very short stems which are seldom round in cross-section, and are mostly right angled. The typical form has a prow-like projection at the front of the bowl. The Lawson site produced a number of stone pipes, most of which are of the detachable type with vasiform bowl and a conical hole for the stem. The clay pipes are quite different from those of the Uren site. For one thing, they rarely are without decoration, which extends in some cases over the stems. Most pipes are decorated with incised lines around the top of the bowl or with punctates, or both. The decoration consists in some cases of modelling of the human face or figure on the bowl and sometimes on the stem. There is a variety of bowl forms: ovoid; barrel-shaped; cylindrical, with or without a projecting collar

[9] Parker, 1920, Pl. 29 and 91. [10] Wintemberg, 1939, Fig. 5, c and d.

at the top; conoidal; trumpet-shaped with various types of flaring rims; and vasiform. A few obtuse-angle pipes, characteristic of the Owasco aspect in New York, are also found.[11] In all, 234 clay pipes came from the Lawson site.

At this point, interpolation of data from Wintemberg's "transitional" stage of development might well show a cultural manifestation that is advanced beyond the Uren material but not as far as the Lawson material. The most significant differences between Uren and Lawson are in pottery and pipes, and Wintemberg's transitional stage might direct emphasis back to the constitutional similarity underlying Uren and Lawson pottery and pipes—a similarity that is based, we contend with Wintemberg, upon generic relationship. Unfortunately we have no excavated site from which to draw our data respecting this "transitional" culture stage, but only surface material. In a study of this type, such data are not only insufficient but are questionable as well. For this reason, we shall omit any discussion of the transitional phase, although its existence seems implied by the Uren-Lawson relationship.

In posing our problem, we limited the scope of our examination of the prehistoric horizon. It is necessary for us only to know the culture of the Neutrals before white contact in order to study the effects of white contact. We can say with some assurance that the Lawson site represents the culture of the prehistoric Neutrals. No European artifacts or trade goods were found on the site, hence it belongs to the pre-contact period, or may stand on the very threshold of the historic period. It is probably a Neutral site, because it is in the heart of the region the historic Neutrals are known to have occupied. Furthermore, many of its traits and elements are very similar or identical to those characteristic of so-called "prehistoric Iroquoian" sites in New York, Pennsylvania, and Ohio. We might mention, for example, the use of earthworks and palisades, storage pits, trumpet pipes, perforated deer phalanges, human face modelling on pipes, net sinkers, etc. In particular, the very common occurrence in pottery decoration at the Lawson site of the "Pan-Iroquoian" triangular plat, which, according to Bailey,[12] "existed on all prehistoric sites (Iroquoian) predominantly, and continued down into early historic times." Undoubtedly our best evidence for identifying the cultural manifestation at Lawson as Neutral would be its high degree of similarity to a known historic Neutral manifestation. Such a comparison, however, must await the discovery and excavation of an historic Neutral site.

[11] Ritchie, 1935, p. 51. The obtuse-angle pipe in New York seems to have its origin in the Vine Valley aspect and hence may be considered a Woodland trait.

[12] Bailey, 1938, p. 338.

Having found that to our first question—what was the nature of the pre-contact culture of the Neutrals?—the available evidence will permit only a conditional answer, we may proceed to the second.[13]

NEUTRAL-WHITE CONTACT

It is improbable that any Frenchman had any first-hand knowledge of the Neutrals up to the time of Champlain's visit to Huronia. Champlain was anxious to enter their country but was dissuaded by the Ottawa, who painted the Neutrals as savage and hostile to strangers.[14] The Hurons employed the same subterfuge against the French who were trying to enter the Neutral country, and we know that when these hints failed, they resorted to stronger measures. The reason in back of this practice was the desire to keep in their own hands the middleman status which they had retained, probably for generations. Their efforts were successful to a large extent. It is unlikely that, even after Champlain's account in 1615, Neutral territory was penetrated by any whites with the possible exception of Brulé in 1615, until Father Daillon spent three months there in 1626. Daillon's sojourn was brief, and from 1627 until 1640 no other missionary visited the Neutrals. In 1640, Brebœuf and Chaumonot spent a year in the Neutral towns.

It seems more than a probability that Daillon's visit represents the first contact between Neutrals and whites. In a letter from Huronia to

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[13] It will be noted from the above comparison that a homogeneous development of so-called "Iroquoian" cultural characteristics from a generalized Woodland patttern has been indicated. It seems to the writer that the traditional theory of an Iroquoian migration up the Ohio River into their historic northeast position does not fit the facts. Perhaps the early and generally unquestioned identification of the Woodland cultural pattern with the northeastern Algonkian-speaking peoples has been largely responsible for the effort to locate a homeland and migration route for the Iroquois. Griffin, in a paper read before the Annual Meeting of the New York State Archaeological Society (May 3, 1941), effectively disposes, we believe, of the hypothetical migration from the southwest. If there were a migration, he claims, its route could hardly be traced, since "they did not bring what we know as the Iroquois culture with them." Perhaps the simplest explanation is the answer: The Iroquois were an early Woodland people in the Northeast who were subjected to certain widespread cultural waves such as Hopewellian and Mississippian and were also exposed to contacts with culturally different groups. In response to these several stimuli they gradually came to change and modify their culture until it attained the stage of development designated by the term "Iroquoian aspect." This explanation, which is suggested by the archaeological material from Ontario, might well gain needed support from re-analysis of the New York State material, a good deal of which lies unpublished in various museums throughout the state. The writer hopes to elaborate on this theory of cultural development from a Northeastern Woodland base into an Iroquoian aspect in a later paper. The acculturation phenomena involved in this development should provide a fascinating problem for future archaeologists.

[14] Champlain, 1922–1936, Vol. 3, pp. 100–101.

France dated July 18, 1627, Daillon tells of his experiences.[15] We get the impression that the Neutrals were seeing a European for the first time. They were "astonished to see me dressed as I was," he writes. They seemed anxious enough to go to the French to trade but could not accept Daillon's invitation, "the whole difficulty being that we did not know the way." Huron traders there at the time assured Daillon and the Neutrals that it was only a ten days' journey to the French trading post, but "we were afraid of taking one river for another, and losing our way or dying of hunger on the land." It can hardly be doubted that, had any French traders been in this land previous to Daillon's visit, they would have been most explicit in directing the Neutrals to their trading posts, since this would have eliminated for the Frenchmen a hazardous journey through Huron territory. Furthermore, Daillon, in his unbounded enthusiasm for this fruitful land, was "astonished how the Company of Merchants, since the time they came to these parts, have not sent some Frenchmen to winter in the said country." The Hurons little relished Neutral and French contact, and, when they learned that Daillon was endeavoring to lead the Neutrals to French trading posts, they circulated evil stories of him among the Neutral villages and succeeded in robbing them of confidence and trust in him.[16]

I would take Hunt's statement—"despite the frantic efforts of the Hurons to prevent it, many a Frenchman penetrated the Neutral country for furs"[17]—to apply to the period after 1627, for the reasons given above. On the other hand, I doubt whether more than a few individual French traders had made the trip before 1640. Hunt's claim is based on a statement of Lalemont to the effect that "many of our Frenchmen who have been here [Huronia] have, in the past, made journeys in this country of the Neutral Nation for the sake of reaping profit and advantage from furs."[18] Elsewhere in Lalemont's account of the mission of Brebœuf and Chaumonot, however, we learn that, outside of the slandering remarks of the Hurons, the Neutrals "had no other knowledge of us." He further relates that both Fathers were warned privately not to visit the Neutrals, "as there had been no other cause for the murder of one of our Frenchmen, that occurred here some years ago, than just such journeys which made the country [Huronia] uneasy and fearful of a transference of trade." This is an example of to what lengths the Hurons would go in order to preserve their middleman status. As Hunt himself puts it: "Had the Hurons lost the Neutral trade it would have been a severe blow to them, as they well knew."[19] Thus there was

[15] Le Clercq, 1881, Vol. I, pp. 263–272. [16] *Ibid.*, p. 267.
[17] Hunt, 1940, p. 51. [18] Thwaites, 1896–1901, Vol. 21, p. 203.
[19] Hunt, 1940, p. 51.

a very real danger to be faced by any Frenchman desirous of trading directly with the Neutrals. On the other hand, the Neutrals were quite amenable to any trade available, be it Indian or French. We conclude, then, that from 1627 to 1640 a few doughty French traders did enter Neutral territory.

Even after 1640 there could have been no significant increase in the contacts between Neutrals and French. In fact, it was not until 1652 that the first Neutral visited a French settlement,[20] so well was the route guarded by the Hurons. The Huron monopoly of the Neutral trade, even at this late date in Neutral history, was quite successfully maintained, as Hunt admits.[21]

Later, after the dispersion of the Hurons and Neutrals, Father Fremin found several towns among the Seneca populated chiefly by remnants of these people. He says: "The first nation is called Onnontioga, the second the Neuters, and the third the Hurons. The first two have, as it were, never seen Europeans, nor ever heard the true God spoken of."[22] This is not strictly true. We have seen that Daillon, in 1627, and Brebœuf and Chaumonot, in 1640, had visited the Neutrals, but they had not stayed permanently, nor had they been in every village. Nevertheless, it helps to bear out the argument that *there had never been any extensive direct contact between Neutrals and whites up to the time of the Neutral dispersion in 1650–1652.*

After the final defeat of the Neutrals by the Seneca, the former fled. Some went south and lived among the Seneca,[23] some may even have joined the Catawba in Carolina,[24] and others joined the refugee Hurons and Petuns around the mouth of Green Bay.[25] At this point (1653) the Neutrals lost their tribal identity, and all three groups are hereafter known as Hurons or Wyandots.

In the whole historic period (1615–1653) we can attribute no Neutral material trait or custom mentioned in the literature to European influence. And yet, even had there been no direct white contact at all, the Neutrals certainly must have received some European goods from the Hurons, who traded for corn, furs, and tobacco. The missionaries brought such things as "knives and other trifles"[26] as presents, and doubtless those French traders that entered brought quantities of cheap European articles. Not only are the documentary sources silent about

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[20] *Ibid.*, p. 57. [21] *Ibid.*, p. 57. [22] Le Clercq, 1881, Vol. I, p. 400, fn.

[23] *Ibid.*, p. 399; Thwaites, 1896–1901, Vol. 57, p. 191. Neutral refugees were found also among the Onondagas by Father LeJeune (Thwaites, 1896–1901, Vol. 44, p. 41).

[24] Hunt, 1940, p. 97. [25] *Ibid.*, p. 98.

[26] Daillon in Le Clercq, 1881, p. 265.

European trade goods and European practices among the Neutrals, but archaeology as well fails us.[27]

Only one excavated site has been reported.[28] It is located on Grand Island in the Niagara River, in the border country of the historic Neutrals. Houghton calls it a "Neuter" site, and, while there is no doubt that it is post-European, nevertheless we would like more assurances of its identity as Neutral. Houghton says that the culture of the Neutrals was, in general, identical with all other Iroquoian nations, but that there are four characteristics which were peculiar to the Neutrals alone: the conch shell and its derivations, the serrated scraper-like saw, the large bone tubes, and the perforated antlers.[29] Whether these are the criteria he used in identifying the Grand Island site, or whether he relied solely upon vague territorial delineations contained in the missionaries' reports, is left untold.

The Grand Island site is a cemetery from which fifty-nine skeletons were removed, but not studied. Of these, thirty-one were accompanied by grave goods. Only eleven of the thirty-one had no European articles at all; the other twenty had either European articles only or a preponderance of them. The European articles included brass kettles, glass beads, iron axes, iron awls and knives, brass points, brass beads, wampum, and a coiled brass spring. The primitive Indian artifacts included pottery, pipes, beads, animal jaws and teeth, shell beads and pendants, stone points and knives, bone combs, and bone tubes. None of the material is illustrated or described.

Until the archaeological criteria for distinguishing the separate cultures of the historic Iroquoian nations are better established, we should not accept these "Neutral" sites unequivocally. If we are right in concluding from the documentary evidence that there was relatively little direct contact between Neutrals and whites, we would hardly expect to find in a Neutral cemetery the profusion of European goods found at the Grand Island site. On the other hand, the Wenros, a kindred group, lived in this same region until their flight to Huronia in 1639. They were known to have had trading relations before 1639 with the "English, Dutch, and other heretical Europeans."[30] In addition, Wintemberg, who, in his more recent publications, seems to talk with authority of many "post-European Neutral" sites, once wrote that many of the sites in Neutral country "probably were occupied by one of the Five Nations,

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[27] True, Wintemberg reports finding many European artifacts on "historic Neutral" sites, but neither he nor Boyle produce the evidence on which they base their identification. See Bibliography for Boyle's reports.

[28] Houghton, 1909*b*. [29] Houghton, 1920, pp. 34–35.

[30] Thwaites, 1896–1901, Vol. 39, p. 141.

after their conquest of the Neutrals in 1651,"[31] and went on to profess that Seneca occupation of the former country of the Neutrals might have been "more extensive than is generally suspected."[32] Perhaps a thorough study of European trade goods of this period would show whether the source of the Grand Island material was Albany or Quebec, and hence identify the site as Wenro or Neutral, for it is unlikely that both French and Dutch traded with the Wenro in this particular period.[33]

EFFECTS OF CONTACT ON NEUTRALS

With regard to the third question on page 303, above, we can only conclude, pending a clarification of the archaeological situation, that from 1615 to 1652 Neutral culture was little affected by the infrequent contacts with the whites. Houghton claims that this was a period of transition for the Neutrals,[34] but the picture of Neutral culture in 1640 drawn by Lalemont is that of a primitive Stone Age group—a pre-contact group. The Neutrals had long been shielded by their neighbors from foreign contacts. Their most frequent relations, outside of war, were with other Iroquoian peoples, principally Hurons. Occasionally they were visited by Ottawa traders, and the Ottawa had been their ally in the war with the Fire Nation. This more or less regimented relationship, which undoubtedly took form in the prehistoric period, developed and crystallized in the historic period. It enabled the Neutrals to live the protected and settled life we have seen reflected at the Lawson site. It had another effect, however—white contact was kept at a minimum. Lack of this white contact left the Neutrals ill-prepared to resist the onslaughts of the Senecas, who had been well-armed by the Dutch.

Thus, to the latter part of our question—what was the effect of white contact upon the Neutral tribe itself as a political entity?—we might reply paradoxically enough that it was the very absence of white contact that contributed heavily to the destruction of the Neutrals as a tribal entity.

CONCLUSION

Our brief survey of material for an acculturation study of the Neutrals has produced somewhat negative results. The evidence that is prerequisite for an analysis of the effects of white contact is incomplete. We have a fair knowledge of a pre-contact culture which is almost certainly Neutral. Documentary sources provide us with a good descrip-

[31] Wintemberg, 1926, pp. 37–38. [32] *Ibid.*, p. 39.

[33] Thwaites, 1896–1901, Vol. 39. The Dutch and English would be sure to poison the minds of the Wenro against the French. [34] Houghton, 1909*a*, p. 273.

tion of historic Neutral culture, but they are not supplemented by reliable archaeological material The documentary data are predominantly of a non-material nature and hence can not be compared with the prehistoric archaeological data, which are largely of a material nature. There is evidence that the contact continuum was neither of long duration nor intense; rather it was spasmodic and not really a continuum at all.

The gaps in our knowledge can, however, be filled. Reworking of the written records combined with careful archaeology will eventually reveal the material contents of the culture of the historic Neutrals, and the effects of white contact, such as it was, will then be observed. History has already recorded the fate of the Neutrals as a political entity; to what extent white contact was a factor in bringing it about is a question that must await further archaeological research.

Thus the possibilities for observing acculturation phenomena in the development of Neutral culture are by no means far beyond the grasp of the scholar. And of all the northeastern Iroquois, the Neutrals offer, indeed, the scantiest evidence for the student of acculturation. Other Iroquoian tribes are much more fully documented, both archaeologically and historically. Fenton suggests that the Seneca offer the best possibilities for an acculturation study, with the Onondaga and Mohawk also likely prospects.[35] These tribes certainly had a much longer historic life, hence the opportunity for observing the contact continuum and the effects of white contact is much greater. The abundant data on the Seneca have been separated, arranged, described, and catalogued; no one, however, has brought them all together and extracted from them the interesting story of cultural development they contain. We have suggested that, as an initial step in such an undertaking, the material be examined in the light of the six essential categories of acculturation data abstracted from the Redfield, Linton, and Herskovits outline for a report on an historic group.

BIBLIOGRAPHY

BAILEY, J. H.
1938. "An Analysis of Iroquoian Ceramic Types." AMERICAN ANTIQUITY, Vol. 3, No. 4, pp. 333–339.

BOYLE, DAVID
1888–1905. Articles in Annual Report of the Canadian Institute (Appendix to the Report of the Minister of Education, Ontario) for 1886–87, 1890–91, 1894–95, 1902, 1903, 1904. Toronto.

BRODIE, W.
1902. "Animal Remains Found on Indian Village Sites." Annual Report of the

[35] Personal correspondence, Feb. 24, 1942.

Canadian Institute (Appendix to the Report of the Minister of Education, Ontario) for 1901. Toronto.

CHAMPLAIN, SAMUEL DE

1922–1936. *The Works of Samuel de Champlain.* Translated and edited by Henry Biggar. 6 vols. Toronto.

COYNE, JAMES H.

1893. "The Southwold Earthwork and the Country of the Neutrals." Annual Report of the Canadian Institute (Appendix to the Report of the Minister of Education, Ontario) for 1892–93. Toronto.

FENTON, WILLIAM N.

1940. "Problems Arising from the Historic Northeastern Position of the Iroquois." In *Essays in Historical Anthropology of North America*, Smithsonian Miscellaneous Collections, Vol. 100, pp. 159–251.

HOUGHTON, FREDERICK

1909*a*. "Indian Village, Camp and Burial Sites on the Niagara Frontier." Buffalo Society of Natural Sciences, *Bulletin*, Vol. 9, No. 3.

1909*b*. "Report on Neutral Cemetery." Buffalo Society of Natural Sciences, *Bulletin*, Vol. 9, No. 3, pp. 377–384.

1916. "The Characteristics of Iroquoian Village Sites of Western New York." *American Anthropologist*, Vol. 18, No. 4.

1920. "History of the Buffalo Creek Reservation." Publications of the Buffalo Historical Society, Vol. 24, Chapt. 2. Buffalo.

1927. "The Migrations of the Seneca Nation." *American Anthropologist*, Vol. 29, No. 2.

HUNT, GEORGE T.

1940. *The Wars of the Iroquois.* Madison.

HUNTER, A. F.

1889. "French Relics from Village Sites of the Hurons." Annual Report of the Canadian Institute (Appendix to the Report of the Minister of Education, Ontario) for 1888–89. Toronto.

KIDD, K. E.

1941. "The Excavation of Fort Ste. Marie." *Canadian Historical Review*, Vol. 22, No. 4, pp. 403–416.

KINIETZ, W. VERNON

1940. *The Indians of the Western Great Lakes.* Occasional Contributions, Museum of Anthropology, University of Michigan, No. 10.

LE CLERCQ, FATHER CHRISTIAN

1881. *First Establishment of the Faith in New France.* Translated and edited by J. G. Shea. 2 vols. New York.

ORR, R. B.

1918, 1922, 1928. Articles in Annual Report of the Canadian Institute (Appendix to the Report of the Minister of Education, Ontario) for 1918, 1921–22, 1928. Toronto.

PARKER, A. C.

1916. "The Origin of the Iroquois as Suggested by their Archaeology." *American Anthropologist*, Vol. 18, No. 4.

1920. *The Archeological History of New York, Part I.* New York State Museum Bulletin, Nos. 235, 236.

REDFIELD, ROBERT, RALPH LINTON, AND MELVILLE J. HERSKOVITS

1936. "A Memorandum for the Study of Acculturation." *American Anthropologist*, Vol. 38, pp. 149–152.

RITCHIE, W. A.

1934. *An Algonkin-Iroquois Site on Castle Creek, Broome County, New York.* Research Records, No. 2, Rochester Municipal Museum. Rochester.

1935. *A Prehistoric Fortified Village Site at Canandaigua, Ontario County, New York.* Research Records, No. 3, Rochester Municipal Museum. Rochester.

1938. "A Perspective of Northeastern Archaeology." AMERICAN ANTIQUITY, Vol. 4, No. 2, pp. 94–113.

SAGARD-THEODAT, GABRIEL

1939. *The Long Journey to the Country of the Hurons.* Translated from the French. George M. Wrong, editor. The Champlain Society. Toronto.

SKINNER, ALANSON

1921. *Notes on Iroquois Archaeology.* Indian Notes and Monographs, Miscellaneous Series, No. 18. Museum of the American Indian, Heye Foundation. New York.

THWAITES, REUBEN G. (editor)

1896–1901. *The Jesuit Relations and Allied Documents.* 73 vols. Cleveland.

WINTEMBERG, W. J.

1901. "Indian Village Sites in the Counties of Oxford and Waterloo." Annual Report of the Canadian Institute (Appendix to the Report of the Minister of Education, Ontario) for 1900. Toronto.

1903. "Archaeology of Blenheim Township." Annual Report of the Canadian Institute (Appendix to the Report of the Minister of Education, Ontario) for 1902. Toronto.

1905. "Relics of the Attiwandarons." *Records of the Past,* Vol. 4. Washington.

1908. "The Use of Shells by the Ontario Indians." Annual Report of the Canadian Institute (Appendix to the Report of the Minister of Education, Ontario) for 1907. Toronto.

1913. *Archaeology of Blandford Township, Oxford County, Ontario.* Victoria Memorial Museum Bulletin, No. 1.

1926. "Foreign Aboriginal Artifacts from Post-European Sites in Ontario." Transactions of the Royal Society of Canada, 3rd series, Vol. 20, Sect. 2. Toronto.

1928*a*. "Artifacts from Ancient Graves and Mounds in Ontario." Transactions of the Royal Society of Canada, 3rd series, Vol. 22. Toronto.

1928*b*. *Uren Prehistoric Village Site, Oxford County, Ontario.* Anthropological Series No. 10, Bulletin No. 51, National Museum of Canada, Department of Mines and Resources. Ottawa.

1931. *Distinguishing Characteristics of Algonkian and Iroquoian Cultures.* Bulletin No. 67, Annual Report for 1929, National Museum of Canada, Department of Mines. Ottawa.

1939. *Lawson Prehistoric Village Site, Middlesex County, Ontario.* Anthropological Series No. 25, Bulletin No. 94, National Museum of Canada, Department of Mines and Resources. Ottawa.

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THOUGHTS ON UTAH ARCHAEOLOGY

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UTAH is nearly bisected north-south by the Wasatch Mountains.[1] Between Ogden and Nephi, Utah, these mountains have undergone extensive folding and faulting and reach a maximum height of 12,000 feet at Mt. Timpanogas. South of Nephi this range branches into three great fingers with narrow valleys between. Flanking the Wasatch, east of Salt Lake City, are the lofty Uintah Mountains. These, unlike other ranges in North America, have an east-west axis forming a barrier between Pueblo-dominated lands to the south and the territory of nomads living in the Wyoming Basin to the north. Little evidence of Pueblo occupation has been observed in southeast Wyoming, though there are a number of passes through which occasional hunting parties from the plateaus to the south may have ventured north into the plains of southern Wyoming. This, of course, could only have occurred in the summer, as the area is free from snow for only three or four months of the year.

To the east of the Wasatch, and south of the Uintah range, lies the great plateau region drained by the Green River and the Colorado River, with their many tributaries, while to the west of the Wasatch lies the vast Great Basin. Numerous mountain ranges occur in the Great Basin itself, but these are not usually very high, and, because of their age, are heavily eroded. In the plateau region there are several large laccolithic structures: the Henry Mountains, the La Sal Mountains, the Abajo (or Blue) Mountains, and Navajo Peak. Great series of cliffs, deep box canyons, and plateaus characterize the topography of much of this area. It is drained by both intermittent and permanent streams, all leading toward the Colorado River. The Great Basin merely forms a large number of receptacles for the streams draining into it.

The importance of mountains to the subsistence activities of the inhabitants of Utah was paramount. As much as eighty inches of rainfall a year are recorded by Weather Bureau stations in the Wasatch Mountains. In contrast, the desert areas to the west, in the Great Basin, may have as little as 4.5 inches of rain a year. For this reason, most of the ruins of the Pueblo people of Utah are found along the base of the Wasatch Mountains where streams furnished water for the cultivation of foods and vegetation for game animals. Both Judd[2] and Smith[3] have already noted that whites, motivated by the same reasons as their In-

[1] The reader is referred to Malouf, 1940, for maps of Utah which may be used for locating place names mentioned here.

[2] Judd, 1926, p. 12. [3] Smith, 1940.

dian predecessors, have built their villages directly upon those of the aborigines.

The earliest remains of prehistoric man in Utah are found in caves around Great Salt Lake in northern Utah. Here, too, are found the northernmost penetrations of southwestern Pueblo cultures. The pre-Puebloid sequences are as yet little known, but they may date back as far as 10,000 years. A considerable amount of work on this problem has been accomplished in recent years by the University of Utah. Present evidence indicates the following sequence in the Great Salt Lake area: Shoshone, which is the most recent; Promontory culture; Puebloid; Black Rock culture; and the Bonneville culture. There is a hiatus between the last two.

The Shoshone: Many artifacts in this level, fortunately, have not decomposed, so that it is possible to describe some of the more perishable objects in the culture. Among these are basketry, skin objects, cedar bark ropes, and foods. Characteristic of Shoshonean peoples were side-notched arrow points. Points that are both side-notched and end-notched are also found, but they are rarer than in the Promontory Culture.[4] Metal objects, such as iron arrow points, are found near the top of this level, indicating the beginning of white infiltrations. Shoshone pottery is very crude and is usually lighter in color than its predecessor, the Promontory ware. Rim designs are not found, but incised body designs are common. A few sherds from Black Rock Cave (No. 3) show that it was made by the coiled process, as the coil marks are still present.[5] The interior of this ware is usually striated, and the exterior is smoothed but unwashed. Tempering is coarse and consists of silicates, or other light-colored materials. The paste, likewise, is coarse. Many of the vessels were apparently flat-bottomed, with wide flaring mouths and outward-sloping sides. They are reported to have been found along the Snake River by investigators from the Museum of the American Indian, and by parties from the University of Utah working in northern Utah and Nevada. At the mouth of Weber Canyon, near Ogden, Utah, they were associated with a peculiar circle of stones which closely resembled a tipi ring. Flat-bottomed pottery of this type has been found as far north as Montana, where it appears in the uppermost levels of caves.[6] Steward[7] and other recorders have also reported it throughout Nevada and in southern California. Although pottery is no longer made by any

[4] Steward, 1937, pp. 84–85. [5] Enger, 1942.

[6] Communication with Mr. William T. Mulloy, Billings, Montana. E. R. Smith and Charles Dibble have located similar wares near White Horse Pass, Nevada, and Logan, Utah. These will be described in a forthcoming University of Utah paper by Smith.

[7] Steward, 1941, p. 340.

of the Western Shoshone groups, some Indians have vague traditions of its having been manufactured in the past.

Arrow straighteners used by the Shoshone were long and narrow and possessed a longitudinal groove down the center. Coiled basketry appears to have been similar to present day Western Shoshone types in shape and method of manufacture.

Promontory culture: In this culture side-notched and end-notched points of obsidian are characteristic, appearing for the first time in the Great Salt Lake region. The pottery is much like that of the Shoshone, except for the greater frequency of rim designs and for its black, burned color. Moccasins and many other objects of bison skins are also characteristic. The place of the Promontory culture in the Great Basin sequences is not quite clear. Steward suggests that Athapascans on their way south might have been responsible for it.[8] Still another suggestion is that it might have been a "localized specialization of a more generalized Shoshone culture," but the preponderance of parallels between the Promontory culture, the Shoshone, and Canadian tribes indicates that it was otherwise. Present evidence shows that there was undoubtedly some contact between the Shoshone people and the Promontory culture, but this evidence should not be construed as indicating that the two were intimately connected. The influence of the Promontory culture on the more southern Shoshone, such as the Gosiute, was almost non-existent; it did not penetrate beyond Utah Lake on the south, nor beyond Wendover on the west. Its eastern and northern boundaries, on the other hand, are still undefined. The pottery found at Deep Creek, Utah, identified as Shoshone ware, has a flavor decidedly different from that of the Promontory culture, although the affinity is greater with the latter than with that of the Puebloans. Metates used by the Shoshone and the Promontory people are likewise similar. Those of the Puebloans are distinct, possessing a secondary depression, and are well publicized as the "Utah type" metate. Both Promontory and Shoshone metates are flat and shallow, being about one foot to 14 inches long, 6 inches wide, and 2 or 3 inches thick. These were ordinarily worked on but one side.

Three of the most outstanding and easily recognized traits of the Promontory culture are:

1. Pottery: coarse silicate temper; rim pieces, about half of which are incised, are widened toward the top. The body may also be incised. Most potsherds found in Great Salt Lake caves containing Promontory culture material are burned black from use in fires.

2. Moccasins: made of buffalo hide. They are of the one-piece, two-piece, and three-piece varieties. In appearance they are not unlike those of the northern Athapascans or Algonkians.

[8] Steward, 1938.

3. Arrow points: usually made of obsidian and in most cases are side-notched, but they may also have an end notch. These are not found in other sites in the immediate vicinity of the Great Salt Lake, except in the upper levels of Pueblo mounds and on the surface of the ground. Side-notched points, probably of Shoshonean origin, are also found in hills and in archaeological sites in eastern Nevada, Deep Creek, the Cherry Creek Mountains, Steptoe Valley, and adjoining localities.

Puebloid: Pueblo wares are found throughout the Northern Periphery and have frequently been described. They resemble very closely Pueblo types already known in the "classic" Southwest. There is no correlation between Pueblo archaeological areas and the domains occupied by the succeeding Shoshone bands.

Black Rock culture: The Black Rock culture is thus far distinguished only by a definite type of corner-notched point. These are usually made of sedimentary and metamorphic materials; the use of obsidian for tools and implements during these times was less common than during the preceding and succeeding periods. They are found in caves in the Great Salt Lake region, but not in mounds. Metates are also found on this level.

Deadman culture: This culture is characterized by two distinct types of points. The first type, a form of the so-called "Yuma point," is a long, narrow and triangular instrument. It is not fluted. The second type is unique in this area. It is widest in the middle and is constricted at the base to form a stem. A variation of this type is like the "Pinto Basin" points.

Metates are present, but they too are simpler than those made by Puebloan peoples. No pottery is found on this level, or in any of the others that precede the Puebloid.

Deadman points were first recognized as a distinct type when Deadman Cave, near Garfield, Utah, was excavated by a University of Utah party.[9] They have also been found in adjoining regions, of which Deep Creek is an example.[10]

Bonneville culture: The only known remains of this culture consist of a burial found by Julian H. Steward in Black Rock Cave (No. 1) on the south shore of Great Salt Lake.[11] The skeleton, that of a baby, was found in prehistoric Lake Bonneville gravels, indicating that it must have been buried some 7,000 to 10,000 years ago. A bone dagger, about six inches long, was found with the burial.

It may be noted that all the pre-Puebloid cultures were based on a hunting and gathering economy. The similarity between these and the Cochise of Arizona is very striking, and the possibility that some connection existed between them is strong. Only in the Pueblo period does

[9] Smith, 1941a. [10] Malouf, 1941. [11] Steward, 1937.

there seem to have been an attempt at horticulture in the Great Salt Lake region, and even then it seems to have been subsidiary to a hunting-gathering economy. Numerous bone fragments, seeds, nuts, and other foods are found much more commonly than cultivated foods, of which corn is the only known representative. Bison were particularly plentiful during Pueblo times, and especially during Promontory times, but they decreased in numbers thereafter. The increase in the size of the buffalo herds in the Great Basin was, therefore, an important factor in the breakdown of the Puebloid culture and the invasion by the Promontory culture from the north. Many of the techniques required for a horticultural existence were already present in the hunting-gathering cultures, so that when Pueblo traits were introduced into the area they were readily accepted. Even so, they seem to have been just as readily abandoned when they met with adverse conditions at the time of the invasion by Promontory culture peoples.

South of the Great Salt Lake region are the Sevier Lake area and central Utah. Here the Puebloid culture seems to have been superseded directly by Shoshoneans who were, as far as is known, without pottery, but who possessed side-notched arrow points. These replace the characteristic tanged points of Utah Puebloans in some of the later sites throughout the region. Pueblo archaeological sites west of the Wasatch can be identified with present-day white villages and towns, but those in the Plateau region to the east are scattered up and down box canyons that have not yet proved profitable for present day farmers to settle. Thus, sites in the latter region are usually named in terms of well-known landmarks such as canyons, or nearby rivers.

At the outset, we find that two great domains existed during the Puebloid era in Utah, one to the east of the Wasatch and another to the west. Resources in the Plateau area were generally different from those in the Great Basin. There were differences not only in the amount of rainfall but also in its timing during the year. A recurrence of a rainy season in the late summer is typical for the Plateau area, but it is not a common feature in the Great Basin. Materials for the manufacture of technical devices were also different. Judd[12] and Steward[13] have suggested that the Pueblo people, when they ventured into the Great Basin, could no longer build masonry houses, as the necessary stones could not be acquired in abundance; hence, they made them of dried adobe blocks, or they constructed their houses in jacal style. Basic materials for the manufacture of tools and implements were also somewhat different. Obsidian, for example, has been shown to have existed in great quantities in that part of Utah lying within the Great Basin,

[12] Judd, 1926, p. 21. [13] Steward, 1933, p. 14.

but not in the Plateau area.[14] Flora and fauna, however, were less diverse than were the inanimate resources.

Each of these two major divisions can in turn be subdivided. This has already been done by Steward (1933) and Malouf (1940). Certain features characterize each of these divisions, which are referred to as areas.

Not all the valleys in the state have soil that is equally good for production in both the margins, at the foot of the mountains, and the centers. Many of the valleys in the Great Basin are completely enclosed; hence, there is no proper drainage. Minerals and salts are washed down from the mountains, and are deposited in the valley bottoms. Only certain wild plants can grow in this type of soil. The cultivation of crops would, as a rule, be preferable along the bases of the mountains for reasons in addition to that of soil quality. First of all, water flowing from the mountain canyons rapidly seeps into the ground and must be diverted for cultivation as close to its source as practicable. Secondly, the period between frosts in the foothills is longer, and the climate less extreme, than in the center of the valley, even though the latter may be lower in elevation.

Some interesting conjectures concerning the supplanting of cultures and the migrations of people in the Northern Periphery can be deduced from the evidences now available, even though they are meager. A site in the Wasatch Mountains, near Hoytsville, Utah, yielded pottery with Pueblo forms but with a coarse tempering like that of Shoshone and Promontory wares.[15] It resembled most closely pottery found in the Uintah Basin in northeastern Utah. No black-on-grey wares have been found at either of these places. Reagan, however, has reported jacal type houses, similar to those found at Willard, in the Uintah Basin.[16] A Promontory, or Shoshone-like, pottery has been reported from the vicinity of Cisco, Utah, which is south of the Uintah Basin. Jacal houses and other Great Basin traits occur in Nine Mile Canyon, Utah, but not farther south in the Plateau region.[17] The data may be graphically presented as follows:

Great Salt Lake Area	*Hoytsville, Utah*	*Uintah Basin*
Shoshone ware	Promontory, or Shoshone-like pottery	Promontory, or Shoshone-like pottery with Pueblo forms.
Promontory ware		Jacal houses.
Pueblo pottery	*Nine Mile Canyon*	No black-on-grey wares
Jacal houses	Pueblo pottery	Masonry houses
Figurines	Figurines	
Coffee-bean design on pottery	Jacal house	
	Coffee-bean design	
	Corrugated ware	
	Masonry houses	

[14] Malouf, 1940, pp. 115–122.

[15] This site was located by E. R. Smith, who was accompanied at the time by the writer. [16] Reagan, 1934. [17] Gillin, 1938.

Sevier Area	*Central Utah*	*Cisco, Utah*
House-walls free standing. Rooms never adjoin. Shoshone and Ute artifacts on surface or near the ground surface.	House-walls free standing. Rooms contiguous. Jacal type also present. Pottery-Sevier forms, but tempering is different.	Promontory, or Shoshone-like pottery.

A series of hunting and gathering cultures existed in western Utah until about 1000 A.D., when Puebloans began to infiltrate into the region. They at first came from the region around St. George, Utah, or from the Virgin area in general, and then they passed on into western Utah as far north as the Great Salt Lake.[18] These people brought with them certain Basketmaker features as holdovers from earlier times. They lacked the kiva, but pit houses and semi-pit houses were present. and they introduced slab-lined storage pits, figurines, tanged arrow points, and some other traits. After this wave of Puebloism reached the Great Salt Lake area, another one began to spread in turn from southern Utah. This latter was responsible for the introduction of houses with free-standing walls of adobe, and some pottery types. A branch of this wave spread westward from central Utah into the Great Basin as far as Ibapah, Utah, or beyond. Before the second wave was implanted firmly in the Great Salt Lake area, the Promontory people began to move in from the north, introducing a Woodland-like pottery and other traits. About this time, the Shoshone peoples began to move northward from southern Nevada and southern California, and about 1300 A.D. the Puebloid period ended in the Northern Periphery. The inhabitants of the Sevier Lake area and central Utah withdrew southward toward the Colorado River. The Shoshone eventually supplanted the Promontory culture in the Great Salt Lake area; the fate of the Promontory people is unknown. The presence of certain traits in the Hoytsville site and in the Uintah Basin shows that a combined Promontory and Pueblo culture might have moved eastward from the Great Salt Lake. The appearance of a jacal type house in the Uintah Basin and in Nine Mile Canyon is confirming. The Shoshone then continued northward into Montana and through the Wyoming Basin to the Great Plains, where a branch of them became the Comanche. Whether there is a connection between the Great Salt Lake material and the Dismal River artifacts in Nebraska does not come within the scope of our problem.

Elaborating on our discussion of the Pueblo culture in central Utah, we find that it may be distinguished from that farther west in the Sevier Lake area by the presence of contiguous rooms instead of single rooms, and by differences in pottery construction, particularly in the less lavish use of coarse tempering. Also, in central Utah, houses with free-standing walls are found superimposed on earlier pit houses. The Sevier Lake area, therefore, may be considered as peripheral to central Utah, having

[18] Colton, 1942, p. 36.

been occupied mainly after the second infiltration of Puebloism had reached the southern branches of the Wasatch Mountains. It is in these intermountain valleys, between the branches, that the central Utah culture was concentrated, whereas the Sevier Lake culture reached far out into the Great Basin.

The connection between central Utah and the Great Salt Lake area may not have been as close as is often suspected. The so-called "false corrugated ware" in the north bears thumb-nail impressions which are purported to be attempts to copy the corrugated material in the south. If this is the true significance of the impressions this would seem to be the result of pretty poor observation of the technique involved on the part of the Great Salt Lake manufacturer. One would expect a better imitation than that offered by the thumb-nail design, if the Great Salt Lake potter had observed the techniques of his southern neighbors. Instead, the thumb-nail impressions are often vertical rather than horizontal, as in true corrugated ware. The free-standing walls of a house excavated by Gillin and party at Tooele, Utah, may also have been the results of an attempt to copy a southern type of house, although the builder failed to observe all the steps necessary in its construction.[19] The distinction is particularly noticeable in the manner in which the walls are joined onto the floor.

The large lakes and rivers in northern Utah made it possible for fishing to become an adjunct to other economic pursuits. Contacts with Snake River civilizations, to the north, were not lacking.[20] Harpoons and fish bones found in ruins around Utah Lake, and other indications, show that these people did not, unlike the present-day Southwestern tribes, disdain fish as a source of food. Later investigations will indicate how important a part fishing played in the subsistence activities of these people. Pre-Puebloid evidences of fishing are known from Deadman Cave, where net sinkers have been found.[21] There is no evidence of any type of water conveyance having been used in fishing on the lakes or rivers.

The failure of any of the cultures in this sequence to use caves in the Wasatch Mountains as habitations is striking. The Promontory Point caves, Black Rock caves, Deadman Cave, and the Wendover caves are all in minor Great Basin ranges. Only one important cave in the Wasatch has been discovered. This was located, by a party from Brigham Young University, in American Fork Canyon, near Provo, Utah; from the data available on the artifacts it apparently had been occupied by Puebloans. Caves are not lacking in the Wasatch, so failure to occupy such shelters cannot be attributed to any deficiency.

[19] Gillin, 1941. [20] Smith 1941*b*, [21] Smith, 1941*a*.

Several archaeological finds have been made in Utah which appear entirely out of place in the general scheme of things. The skin shields and moccasins found by a Mormon bishop near Fruita, Utah, and figured by Morss in his publication on the Fremont River culture, may not have as great an antiquity as has been claimed.[22] The moccasins "smell" of the Promontory type, and the shields themselves may at least be post-Puebloan. In the same area, near Cainsville, Utah, there are a number of stone circles on the ground that have the appearance of tipi rings. These, however, are divided by means of stone rows into four parts, pie-cut style, and suggest a possible connection with the "medicine wheels" found in Wyoming and the Plains region. Circles of stones also appear in the Great Salt Lake region, particularly between Salt Lake City and Ogden, but they do not have the dividing lines inside; hence, they are possibly Ute, or Shoshone, tipi rings. At Wendover, Utah, there are other curious constructions which cannot be identified with any particular culture. These were observed by Elmer R. Smith near caves which he had excavated; they consist of circular walls, built of calcareous Lake Bonneville deposits, located at the bases of the cliffs in which the caves are found. The walls, as they appear at present, are about 2 feet high, and about 4 feet in diameter. No identifiable artifacts have been found in any of these structures, except in the aforementioned tipi rings at Weber Canyon, where flat-bottomed Shoshone-like pottery was found. It is claimed that Promontory pottery has been found in Pueblo mounds at Provo, Utah, but this seems to have been rather late. The pottery does not have the coarse tempering of the Promontory wares. It does, however, have a thickened rim, and sometimes even has a rim design, but this feature is not nearly as common as it is among the wares from Promontory Point itself. This suggests that the Pueblo people and the Promontory culture peoples may have lived side by side for a while, reciprocally influencing each other's ceramics.

It has been nearly a decade since Julian H. Steward last expressed his ideas on the culture history of the Northern Periphery, and, despite the efforts of a few investigators, little has been added since that time. Hundreds of square miles have not even been visited by survey parties. Idaho and northern Nevada, practically unknown archaeologically, offer real challenges. Further exploration of the Northern Periphery will be rewarding, not only because of the light it will cast on problems confronting workers in other areas, but also because it will reveal in the region a culture history which in itself fully merits the interest of the archaeologist.

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[22] Morss, 1931.

BIBLIOGRAPHY

COLTON, HAROLD S.
1942. "Archaeology and the Reconstruction of History." AMERICAN ANTIQUITY, Vol. 8, No. 1, pp. 33–40.

ENGER, DOUGLAS
1942. *Archaeology of Black Rock III Cave, Utah.* Archaeology and Ethnology Papers, No. 7, Museum of Anthropology, University of Utah.

GILLIN, JOHN P.
1938. *Archaeological Investigations in Nine Mile Canyon, Utah.* University of Utah Bulletin, Vol. 28, No. 11.
1941. *Archaeological Investigations in Central Utah.* Peabody Museum Papers, Vol. 17, No. 2. Cambridge.

JUDD, NEIL M.
1926. *Archaeological Observations North of the Rio Colorado.* Bureau of American Ethnology, Bulletin 82.

MALOUF, CARLING
1940. "Prehistoric Exchange in the Northern Periphery of the Southwest." AMERICAN ANTIQUITY, Vol. 6, No. 2, pp. 115–122.
1941. "The Archaeology of the Deep Creek Region, Utah." In a symposium edited by E. R. Smith. Archaeology and Ethnology Papers, No. 5, Museum of Anthropology, University of Utah.

MORSS, NOEL
1931. *The Ancient Culture of the Fremont River in Utah; Report on the Explorations under the Claflin-Emerson Fund, 1928–29.* Peabody Museum Papers, Vol. 12, No. 3. Cambridge.

REAGAN, ALBERT B.
1934. "Some Notes on the Earth-Lodge Peoples of the Willard Stage of Pueblo Culture in the Uintah Basin, Utah." *El Palacio,* Vol. 30, pp. 236, 241.

SMITH, ELMER R.
1940. *Areas of Prehistoric and Historical Settlements in Utah.* Proceedings, Utah Academy of Arts, Sciences and Letters, Vol. 17. Provo, Utah.
1941*a*. *The Archaeology of Deadman Cave, Utah.* University of Utah Bulletin, Vol. 32, No. 4.
1941*b*. *An Indian Burial, a Barbed Bone "Projectile Point," and Accompanying Artifacts from Bear Lake, Idaho.* Archaeology and Ethnology Papers, No. 6, Museum of Anthropology, University of Utah.

STEWARD JULIAN H.
1933. *Archaeological Problems of the Northern Periphery of the Southwest.* Museum of Northern Arizona, Bulletin 5. Flagstaff.
1937. *Ancient Caves of the Great Salt Lake Region.* Bureau of American Ethnology, Bulletin 116.
1938. *Basin Plateau Aboriginal Socio-Political Groups.* Bureau of American Ethnology, Bulletin 120.
1941. *Culture and Distribution XIII: Nevada Shoshone.* Anthropological Records. Berkeley.

Salt Lake City, Utah
September, 1942

FACTS AND COMMENTS

A PREHISTORIC METHOD OF COLLECTING WATER

While in the field, running a stabilization survey at Wupatki National Monument, the writer and Phillip Van Cleave, an assistant, encountered a site which illustrates another method utilized by the prehistoric Indians in dealing with the problem of water supply in this arid region.

A number of sherds, apparently from one vessel, were noted in an area less than a meter square. Believing that there were a sufficient number of sherds present to allow for a partial reconstruction of the vessel, we collected them. In scratching around on the surface to make sure that all had been obtained, we uncovered others less than three cm. below the ground level, in a vertical position and forming an arc of a circle. By removing the upper few centimeters of soil along the projection of this arc, we found sherds forming an almost complete circle. These exposed sherds were similar to those collected on the surface and represented the outline of the jar from which the surface sherds had been broken.

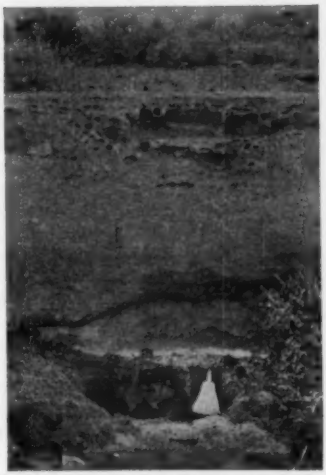

FIG. 26.—Part of pottery vessel in situ, Wupatki National Monument.

A cut was made through the clayey sand to one side of the jar and half of the vessel was exposed and photographed. The exposed portion revealed the form of the jar (Moenkopi Corrugated, dates 1075–1275 A.D.)[1] in situ, in spite of the fact that this portion was broken into about fifteen sherds. The sherds fitted snugly together and adhered to the interior matrix to give the appearance of a restored vessel.

The exposed half was removed to make an investigation of the contents, which proved to be a semi-consolidated cinder fill, the consolidating agent being the clayey soil which had entered through the cracks in the vessel. This fill was cleaned out, and the sherds of the other half of the vessel, still in situ, were photographed (Fig. 26). The maximum internal diameter of the vessel was 35 cm. and its height was 46 cm., with allowance for a projection of 6–7 cm. above the old surface, based on the sherds collected on the surface. One slab house and two cave shelter sites were located within twenty meters of the jar.

The vessel was imbedded in the ground in a hard clayey soil directly against an outcrop of Moenkopi sandstone. At present, this clayey soil is covered with about 2 cm. of windblown volcanic cinders.

The drainage on the surface of the Moenkopi sandstone outcrop in this vicinity converges at a point 76 cm. above, and 4 cm. behind the vessel. Direct drip from above,

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[1] Colton, H. S. and L. L. Hargrave, *Handbook of Northern Arizona Pottery Wares*. Museum of Northern Arizona, Bulletin 11, Flagstaff, 1937, pp. 196–197.

therefore, could not enter the vessel under present circumstances. It is possible, however, that the outcrop at one time projected farther out, as freezing in winter causes considerable exfoliation, especially on those outcrops with a western exposure similar to that of this site. Two naturally-eroded depressions on the top surface of the outcrop, broken out on the lower sides nearest the location of the vessel, aided further in concentrating the drainage from a point 197 cm. back from the edge of the outcrop to the edge itself. Thus, during a rain, water from a considerable area converged and drained over one small spot below which the vessel had been placed. Today a small wash runs from below this point on the edge of the outcrop (over the vessel) into a larger wash some ten meters away. This drainage undoubtedly lowered the ground level abutting the outcrop.

According to the estimate, breakage at the top has reduced the height of the vessel by 6 or 7 cm. Thus, if these sherds had been in place, the rim of the jar would have projected above the present surface for about 3 or 4 cm. If we assume the vessel was imbedded here to catch water, the mouth must have been flush with the surface, or slightly lower, to allow water to enter from the surface if direct drip was not involved. This would mean that soil to a depth of 3 or 4 cm. has been eroded away by continual drainage over this spot during a period of at least 650 years. If direct drip was the method utilized, no postulations are necessary regarding the level of the mouth of the vessel relative to the ground surface. Thus, when the situation is analyzed in the light of the environment, the only reasonable assumption is that the vessel was imbedded for the purpose of catching water.

By way of experiment, a container was placed in the spot from which the vessel had been removed. During a rainfall of .23 inches it was observed that no water had run out of the two depressions above the vessel on the outcrop. This would indicate that a greater amount of rainfall is necessary (estimated .50 inches) before this method of collecting would function. Rainfall of such magnitude occurs only in late summer in this area and this would imply a seasonal method.

In brief, the postulated history is as follows. The vessel was imbedded in the clayey soil in the position described. If direct drip was not employed, the clayey surface was made flush or slightly higher than the mouth of the vessel. During rains water drained off and down the side of the outcrop to the ground level at a point about 4 cm. behind the vessel, and then ran into the jar. After the vessel was no longer used and was forgotten by its owner, drainage during rains washed down from above more and more water, which was absorbed by the ever-increasing cinder fill that was being blown into the jar. Of course, after the rains, the moisture was released by the cinders. In time, the jar was filled with cinders, and, through absorption of water during rains and release of water after rains, stresses and strains were set up in the cinder contents of the vessel which brought about the cracking of the jar. The clayey soil, in which the vessel was imbedded, worked into the interior during the rains and consolidated the cinders. Thus, in time, water no longer entered the vessel, but passed over and around it. The upper portion of the jar may have broken off when the jar cracked in place.

The writer is not fully convinced that this interpretation is correct. As a result of this paper, it is hoped that other field men will keep an eye open for similar occurrences in this region which may substantiate it.

ALBERT H. SCHROEDER
Wupatki National Monument
December, 1941

MESCAL KNIVES FROM SOUTHERN NEVADA

A number of mescal knives have been found throughout the southwestern United States, but very few of these have been adequately described in print. As the use or non-

use of this distinctive type of implement may in the future be of aid in establishing cultural affiliations and migrations of peoples, a brief description of two of these unusual pieces is presented below.

The first of these mescal knives came from a small cave, or rock shelter, located about three and one-half miles southeast of the former town of St. Thomas, Nevada, at the foot of Bitter Spring Wash, where the latter enters the Virgin River. This site is now forever covered beneath the waters of Lake Mead, backed up behind Boulder Dam. The cave was excavated in 1936 by Civilian Conservation Corps enrollees under the direction of Junior Foreman Fay Perkins and under the supervision of the National Park Service.[1]

This mescal knife, illustrated in Plate XXXIII, consists of an iron blade set in the center of a rounded or oval wooden handle. The mesquite wood handle is 28.3 cm. (11⅛″) in length and 4.5 cm. (1¾″) in width at the center, tapering to 3.4 cm. (1 $\frac{5}{16}$″) nearer the ends and then bulging slightly to provide better hand holds. In thickness, it varies from 2.6 cm. (1″) at the ends to 2.7 cm. (1 $\frac{1}{16}$″) at the center. The entire handle has been rubbed relatively smooth, with the exception of the rounded ends where cutting marks are still in evidence. The iron blade, now badly pitted and partly worn away, was 7.3 cm. (2⅞″) in width where it enters the wooden handle, protruding 4.8 cm. (1⅞″) beyond the handle. As near as can be told at present the blade measured about 3 mm. (⅛″) in thickness. The blade was set in a shallow groove cut in the center of the wooden handle and was firmly held in position with a liberal application of pinyon gum.

This knife was found a few inches below the surface in the upper layers of the dry cave. All of the associated material in the upper layers to a depth of one foot consisted of Paiute Indian artifacts, including two chert scrapers, a small triangular arrow point, part of a wooden foreshaft, a flat quartzite metate and a mano, and two long iron rods, each with a hook at one end. The last were probably used to extract small animals from underground burrows or to pull cones and nuts from trees. In the lower levels of this rock shelter, from 2 to 4 feet below the present surface, numerous Pueblo materials were uncovered, ranging from plain gray and black-on-gray potsherds to manos and metates, arrow points with short, narrow stems and oblique notches, scrapers, drills, fragments of coiled basketry, and bone and shell ornaments. This mescal knife undoubtedly belongs to the Paiute period, probably dating back to about the middle or latter part of the 19th century, after the introduction of iron by the whites. Mescal knives set with stone blades have also been found in this area.[2]

A second mescal knife now in the Overton Museum came from a small rock shelter located on the eastern bank of the Virgin River not far from the first cave. This knife consists of a round wooden handle 22.8 cm. (9″) in length and 4.5 cm. (1¾″) in width, with an inset iron blade measuring 4.1 cm. (1⅝″) in width and 3.2 cm. (1¼″) in length. It was found at a depth of one foot below the present surface of the cave. Associated with it were a number of heavy, brownish-black Paiute potsherds, fragments of basketry, and several lumps of rock salt. Beneath this upper Paiute layer of occupation were Pueblo gray and black-on-gray potsherds, remnants of cotton cloth, fragments of coiled basketry, and bone implements.

From the large number of mescal pits occurring in this southern Nevada and northwestern Arizona region it is evident that mescal provided a considerable part of the diet of people inhabiting this area. Mescal pits have been found in conjunction with historic Paiute and Walapai camp sites, as well as with prehistoric Pueblo camps.

Mescal pits in this area are generally found at elevations ranging from 2500 to 3500

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[1] The material from this excavation, including the mescal knife, is at present on display at the Overton Museum of Archeology, Overton, Nevada, in the Boulder Dam National Recreational Area.

[2] Harrington, 1942, p. 67.

feet above sea level. However, along the western portion of the Grand Canyon of the Colorado, within the canyon itself, mescal pits have been located at much lower elevations, occurring as low as 1000 feet above sea level, along the very banks of the Colorado River. These mescal pits are circular in form, varying from 16 to 20 feet in diameter, with rims rising from a few inches to as much as 12 inches above the surrounding terrain (Pl. XXXIII, *middle*). Several pits that have been tested showed depths of from three to five feet, with ash, charcoal, and broken firestones comprising the greater part of the contents.

While ordinarily these pits are located near relatively small camp sites which show seasonal occupation only, several of those along the Colorado River in the western Grand Canyon have been found adjacent to small permanent pueblos (Pl. XXXIII, *lower*). Potsherds and other artifacts point to a date of approximately 1000 to 1200 A.D. for the occupation of these pueblos and the utilization of the adjoining mescal pits. However, most of the mescal pits are located in the higher hills, away from the rivers and larger settlements, yet close to the areas in which the mescal plants grow. Near almost every spring in the huge triangular area lying between the Virgin and Colorado Rivers may be found one or more large mescal pits, and within one hundred yards may also be found a small Paiute or Pueblo cave shelter or open camp site. A number of these camp sites, occurring in shallow recesses in the sandstone cliffs, must have been used over a considerable period of time, as they show accumulations of ash, charcoal, and other camp refuse to depths of from two to five feet.

Presented below is a brief bibliography of published articles on mescal knives and mescal pits, and their distribution throughout the Southwest.

BIBLIOGRAPHY

BARTLETT, KATHARINE
1934. *The Material Culture of Pueblo II in the San Francisco Mountains, Arizona.* Museum of Northern Arizona, Bulletin 7. Flagstaff.

FEWKES, J. WALTER
1898. *Archeological Expedition to Arizona in 1895.* Bureau of American Ethnology, 17th Annual Report, Vol. 2.

GIFFORD, E. W.
1932. *The Southeastern Yavapai.* University of California Publications in American Archaeology and Ethnology, Vol. 29, No. 3.

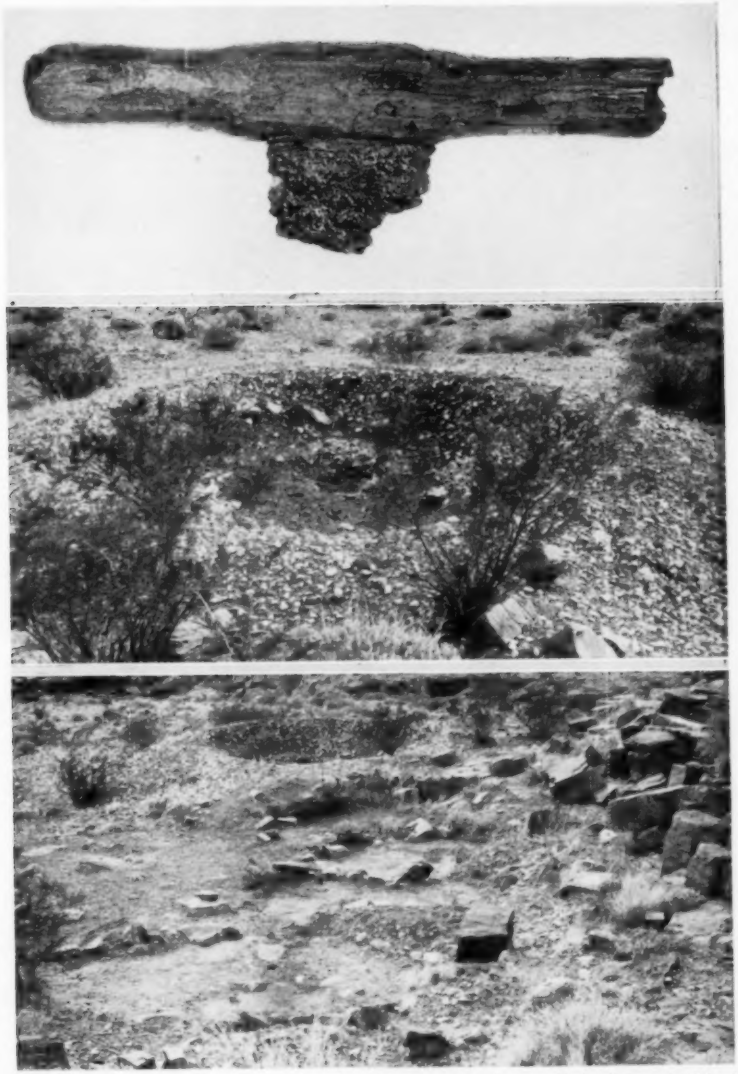
GODDARD, PLINY EARLE
1921. *Indians of the Southwest.* American Museum of Natural History, Handbook Series 2, [2 ed.], New York.

HARRINGTON, M. R.
1930. *Archeological Explorations in Southern Nevada: Paiute Cave.* Southwest Museum Papers, No. 4.
1937. *Ancient Tribes of the Boulder Dam Country.* Southwest Museum Leaflets, No. 9.
1942. "A Rare Mescal Knife." *The Masterkey,* Vol. 16, No. 2, pp. 67–8.

KROEBER, A. L.
1935. *Walapai Ethnography.* Memoirs of the American Anthropological Association, No. 42.

SPIER, LESLIE
1928. *Havasupai Ethnography.* Anthropological Papers, American Museum of Natural History, Vol. 29, Pt. 3.

GORDON C. BALDWIN
Boulder Dam National Recreational Area



(Photos courtesy of Boulder Dam National Recreational Area)

Artifact and sites of southern Nevada. *Upper*, mescal knife. *Middle*, mescal pit in western Grand Canyon. *Lower*, mescal pit and small pueblo.

A NOTE ON MIDDLE MISSISSIPPI ARCHITECTURE

In Dr. Philip Phillips' recent paper, "Middle American Influences on the Archaeology of the Southeastern United States,"[1] there appears the following statement concerning the architecture of late cultures associated with the Mississippi pattern:

> Of house types and methods of construction generally, little is known. Most indications point to a simple rectangular single-roomed type of dwelling without specialized entrance or other features. Larger ceremonial houses or "temples" were not more elaborate. Construction seems to have been chiefly of a bent-pole framework covered by cane, thatch, or clay daub. Interior posts occasionally indicate a less flimsy rigid-frame type of construction.

This paragraph illustrates a prevalent conception of the architecture of the general cultural grouping termed the Middle Mississippi phase. Similar types were also built by Caddoan and earlier peoples generally considered as representative of the Lower Mississippi phase.

This type of architecture features pole, sapling, and cane frameworks, mud-plastered (wattle) walls, and thatched roofs. Phillips' statement implies the use of only one of a series of wall-coverings: "cane, thatch, *or* clay daub." Actually, all these components were used in a single dwelling. These materials admittedly give an impression of relatively impermanent, "flimsy" construction. This impression has been bolstered by various classical ethnohistorical accounts of house-construction among certain Southeastern tribes.

Thus Charlevoix's account for the Natchez[2] mentions that the walls of their "cabins" seemed only "tolerably strong," and were covered with "very thin mats." Du Pratz' description[3] for this same group mentions "young poles," "bowers," and "bundles of grass"—all terms connotative of delicate construction.

Penicaut,[4] on the other hand, discusses the building of a "temple" of a non-Natchez (probably Creek) group in more massive terms:

> It (the temple) is built of walnut trees, as thick through as the thigh below . . . . They wall in and fill up the empty spaces between the lathes (of the inner and outer walls) with heavy earth . . . .

There can be no doubt that a dwelling or ceremonial structure built of such perishable materials as wood, canes, and grass thatch is hardly as durable or lasting as a stone building. From the standpoint of preservation such construction is "flimsy." This interpretation unfortunately implies, however, that this architecture was flimsy in terms of its own cultural setting. That is, it represented a poor attempt at sheltering and housing the people. It is this implication that we wish to dispel in this brief communication.

At the Kincaid Site, in southern Illinois, the University of Chicago has excavated a number of ceremonial and domestic structures connected with the large Middle Mississippi (Tennessee-Cumberland aspect) component. These buildings have all been burned and covered with earth during the conflagration, which has preserved an abundance of charred materials from the walls and roof. A recent analysis[5] of these remains has revealed the following features:

Walls were constructed by placing poles or saplings in a trench and bending these over at the top to produce a peaked or domed roof. Horizontal poles were lashed to the sides, to produce a lattice. Reeds were then lashed to the lattice. The next step was to plaster a thick layer of clay on both sides of this lattice, over the reeds, then to cover this clay with a matted layer of grass fibers. The final step was to cover this grass with cane

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[1] In *The Maya and Their Neighbors*, Appleton Century, 1940.

[2] J. R. Swanton, *Indian Tribes of the Lower Mississippi Valley*. Bureau of American Ethnology, Bulletin 43, 1922, pp. 59–61. [3] *Ibid.*, p. 64. [4] *Ibid.*, p. 159.

[5] By this author and Mr. John Adams.

mats—large and thick for the outside, thinner for the inside. The wall thus formed was nearly one foot thick, and obviously very rigid—hardly a "flimsy" structure.

Roofs were thatched with bundles of grass fibers lashed to the curving lattice of the domed roof. Rafters and stringers were also built in to form a ceiling, on top of which corn was stored. There is also evidence to indicate that gabled roofs were sometimes used.

In addition to these features, ceremonial or political structures on top of the mounds contained plastered clay benches, banquettes, porticos, and double-post plastered pillars. Fire basins in the ceremonial structures were much larger and more elaborate than those in the dwellings. Wall-posts in these buildings were 8 to 12 inches in diameter, too large to be bent over to form a peaked roof. Roofs were probably made of cribbed logs.

Dwelling houses in the village area were not less than 12 feet long and 9 feet wide. The majority were much larger—up to 35 feet long and proportionately wide. Ceremonial buildings were not less than 40 feet long, and some were square.

Double wall-trench patterns for many village houses indicate some form of multiple wall, which would make the total thickness about two feet. Unfortunately, no well-preserved specimens of this double-wall type have been found.

Interior furnishings include benches and beds, built along the walls, centrally-located multiple clay fire basins, and scattered interior support posts. Walls were hung with reed and cane matting. Beds and benches were also covered with mats. Houses had a single side-entrance.

It is evident from this brief description that these structures were not only substantial, but constructionally complex, and were doubtless equipped to withstand the elements. The thick grass fillers inside the walls would act as a still-air chamber, which would insulate the house against both heat and cold. Thatched roofs would make excellent watersheds.

The proximity of Kincaid to stone outcrops in the hills might make us wonder why the Indians never utilized stone for building materials. The answer is twofold: (1) The southeastern cultural tradition did not include such a trait, and (2) the climate and frequent floods in the bottoms required just such a structure as described. The architecture can be considered as a nearly perfect adaptation to the environment.

Evidence from the Southeast in general, and particularly from the Tennessee Valley, indicates that the Kincaid architecture is typical for Middle Mississippi, and is not necessarily more complex and durable.

Doubtless the smaller dwellings and storehouses in this architectural pattern were "flimsy," but this does not hold for the vast majority of the structures. The evidence suggests a complex, durable, rather massive construction, uniquely utilizing perishable materials.

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SOME SCULPTURED ARTIFACTS FROM EASTERN MONTANA

Three peculiar carved stone objects from eastern Montana merit mention, because carved biomorphic forms are otherwise almost entirely absent from this area (Fig. 27).

One was found on the surface about twenty miles south of Glendive, Montana. It is a vaguely trapezoidal piece of rather hard pumice 4.7 inches high, 5.1 inches wide, and 3.5 inches thick, which had been smoothed throughout, apparently with a rubbing stone, though on the back and sides many irregularities remain. A large, flat area has been smoothed on the bottom, apparently to provide a base. On one side an excellent representation of a bison head has been carved in bas-relief. The background has been so reduced

that the head is elevated .3 inch above it. The whole has been well smoothed and rounded and only a few striations remain which suggest that the work was probably done with a stone chip or similar tool. Each eye has been accentuated with a daub of what appears to be pitch.

Another similar object, found on the surface in the vicinity of a large group of petroglyphs near Crow Rock in eastern Montana, is made of light pumice. It is a somewhat irregular stone, smoothed only on one side and the base, which is flattened like that of the object above. It is 3.9 inches high, 3.1 inches wide, and 2.2 inches thick. On the smooth side has been carved a nude female figure. A portion of the upper half has been broken off, so that only the lower half of the head remains. At either side of the head is a faint suggestion of some sort of ear ornament. The figure is well smoothed in the same technique as the previously described figure and is elevated about .2 inch above the background.

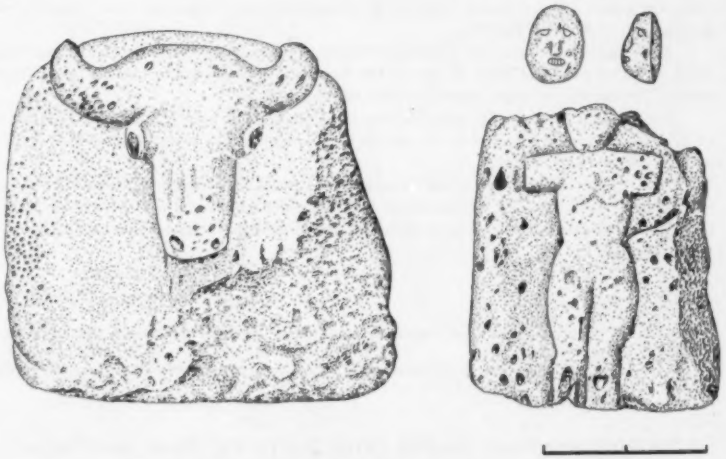

FIG. 27.—Sculptured stone artifacts from eastern Montana.

These two objects are similar in execution, and in that each has a flat base, as if made to stand on a flat surface.

The third object is a human head carved in steatite. It was found in Ghost Cave, about ten miles south of Billings, Montana, in a late prehistoric, non-ceramic cultural horizon identical with Pictograph Cave III.[1] It is smoothed throughout, being flat on one side and convex on the other. On the convex side are carved human features, with the eyes and mouth finely incised and the nose exposed in slight relief. It is .95 inch long, .6 inch wide, and .5 inch thick.

WILLIAM MULLOY AND OSCAR LEWIS
The Montana Archaeological Survey

[1] William Mulloy, "Some Ancient Caves in The Yellowstone Valley." Unpublished ms. in the files of The Montana Archaeological Survey

HOPEWELLIAN IN MINNESOTA

The recent synthesis of Minnesota archaeology by Wilford has revealed the presence of Hopewellian-like materials in the northern part of the state. These seem thoroughly blended with "Lake Michigan" Woodland traits and may represent the feathering out of the Hopewellian complex and its integration into existing Woodland manifestations.

None of the "spectacular" Hopewellian traits are present in the Laurel and Arvilla foci, however, and it is doubtful if they can be properly called "Hopewellian." In this connection I believe it may be of interest to note an early report of excavations at St. Paul, Minnesota, by T. H. Lewis.[1]

Lewis describes a series of small conical mounds located on a bluff in the city of St. Paul. The mounds contained flexed burials, cremated burials, perforated bear canines, an oval copper gorget with two perforations, and *unio* shells. The artifacts and shells were apparently placed with the burials. One mound contained a series of square stone cists, each with a flexed burial. There is no information as to whether these burials were accompanied by artifacts.

Most significant, however, is the description of what seems to be a red clay funerary mask, molded over the skull of one of the burials. Lewis describes this in fairly clear terms. The mask crumbled before it could be removed.

Previous knowledge of clay masks has been confined to the Red Cedar River focus of Wisconsin Hopewellian.[2] Here the masks were accompanied by well-developed Hopewellian pottery and artifacts.

This report seems to extend our knowledge of certain Hopewellian traits into the area intermediate between Red Cedar River and the northern Minnesota Woodland manifestations, and provides a linking factor in the northwest attentuation of the Hopewellian complex.

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[1] Lewis, T. H. "Mounds and Stone Cists at St. Paul, Minn." *American Antiquarian*, Vol. XVIII, pp. 314–320. Chicago, 1896.

[2] L. R. Cooper, *The Red Cedar River Variant of the Wisconsin Hopewell Culture*. Bulletin of the Public Museum of Milwaukee, Vol. 16, No. 2.

EDGED (TANNING?) STONES FROM SOUTH CENTRAL MONTANA AND NORTH CENTRAL WYOMING. THEIR POSSIBLE USE AND DISTRIBUTION

In June of 1937 my attention was called to a very stylized artifact found in the vicinity of the Indian Caves by Mr. John Nelson of Billings, Montana. Mr. Nelson had some very fine specimens of this artifact.

The location and description of these artifacts are described by Mr. Nelson as follows:

> Beveled edged stones were found along the Yellowstone and Clarks Fork Rivers drainage to a point 60 miles northeast of Billings, Montana. The first one of these beveled stones to be collected by me in 1933—Fig. 28, No. 1, green diorite—was on the head of the Middle Fork of Canyon Creek 20 miles west of Billings, beneath a sandstone escarpment in a deep dry wash near the immediate vicinity of a large camp site. At this particular camp site as well as most of the sites where these beveled stones are found, they are found in association with the oval manos and metate.
>
> Further east along this escarpment about 5 miles, I found several, one—Fig. 28, No. 7, horn blend granite—on top of an escarpment in the immediate vicinity of a camp site in association with the oval manos and broken metates.
>
> In the Hoskins Basin 30 miles north on the head of the North Fork of Crooked Creek I found more of

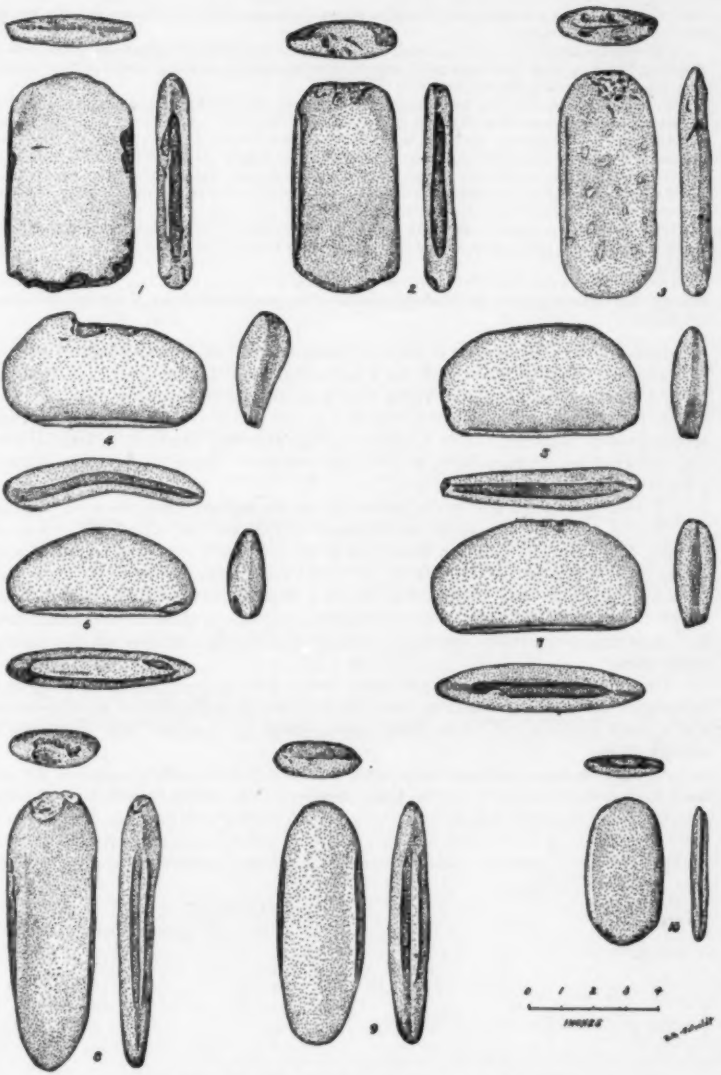

FIG. 28.—Edged stones from Montana and Wyoming.

these beveled stones in a camp site but I found no manos or metates. One beveled stone, shown in Fig. 28, No. 2, is of brown quartzite.

Fifteen miles farther on to the southeast, on some high sandstone rims 5 miles north of the town of Shepherd, Montana, while Mr. Lewis and I were doing reconnaissance, we found several of these beveled stones and also the oval manos and metates in these sites.

We also found several of these beveled stones that had been destroyed by using them as pot rocks. One of these specimens, shown in Fig. 28, No. 8, is of basalt.

Approximately 50 miles on northeast, at Castle Rock Butte I found another of these beveled stones in a camp site beneath some sandstone rims at the head of a deep wash where the fire beds and pot rock were exposed beneath a deposit ten feet deep. I also found the oval manos here. This is the farthest point northeast that I have found these beveled stones and have no knowledge of anyone finding them beyond this point. The one shown as Fig. 28, No. 4, is of grey basalt.

While checking over a site 11 miles south of Billings, near the Indian Caves, I found one of these beveled stones. This particular piece, the smallest of these stones I have found, shown as Fig. 28, No. 10, is of greenish granite.

I found another one of the same type of stones on the head of Wyoming Creek near the Wyoming-Montana state line on the Plateau of the Beartooth mountains in a camp site in association with the oval manos and metate.

Later I collected a number of these artifacts, usually below escarpments or rims on old camp sites, in association with the oval manos. I collected one, Fig. 28, No. 9, of green diorite, in the Musselshell Valley near Roundup, Montana.

In the excavation of the Red Lodge Site, in the summer of 1938, twelve very fine specimens were collected. Mr. N. C. Nelson of the American Museum of National History collected one on Sage Creek in the Pryor mountains during the summer of 1941, while excavating a cave in that vicinity.

In 1940 I collected one in the excavation at Pictograph Cave south of Billings; Fig. 28, No. 6, of biotite granite, was collected in 1938 on Clarks Fork River west of Bridger, Montana. The specimen shown in Fig. 28, No. 3, of a very hard limestone with fossils in it, was collected in 1938 in the Owl Creek mountains north of Shoshoni, Wyoming, in a valley site. Another, Fig. 28, No. 5, of green diorite, was found at the head of Dry Head Creek, which runs into the Big Horn river above Hardin, Montana. These finds show an east-west distribution of one hundred miles and a north-south distribution of 250 miles.

The stones are roughly oval and range in size from 4½ to 8¼ inches long, 2½ to 4 inches wide, and ¾ to 1½ inches thick. Some are worn with a single bevel on one edge, some with a single bevel on both edges. Some have a double bevel on one edge, some have it on both edges.

All show striae cross-ways. Some show a very high hand polish from use. All are made from stream boulders of various kinds: diorite, granite, biotite granite, horn blended granite, quartzite, felsite, basalt, and a very hard limestone with fossils in it. So far as I know, they have not been collected from any other locality, though I have seen most of the local collections while on reconnaissance work as Field Supervisor of the WPA Montana Archaeological Survey.

OSCAR T. LEWIS
Montana Archaeological Survey

BOOK REVIEWS

Excavations at Guasave, Sinaloa, Mexico. GORDON F. EKHOLM. (Anthropological Papers of the American Museum of Natural History, Vol. 38, Pt. 2, pp. 23–139, 22 text figures. New York, 1942. $1.50.)

HISTORICAL BACKGROUND

The appearance of Dr. Ekholm's monograph nearly doubles the published information available on Sinaloa archaeology. As of January 1943, there have been two areal surveys and three excavations, from which have resulted three published monographs and one report still in press.[1] Much as these surveys, excavations and reports have increased our knowledge of Sinaloa archaeology, there are still very large and important areal, temporal, and cultural gaps comparable with the situation obtaining in the Valley of Mexico twenty to thirty years ago.

Although archaeologic work in Sinaloa can be said to have begun in 1929, notes and collections by non-archaeologists go back at least to 1865, and the accounts of white men concerning the region and its inhabitants commence in 1530. Between 1530 and 1536 Nuño de Guzmán and his lieutenants explored and conquered most of Sinaloa, and Francisco de Ibarra (1564–1566) nearly completed this work and attached all of what is now Sinaloa to Nueva Vizcaya (with administrative center in Durango), to which it belonged until 1734. So completely were the natives killed off, sent away as slaves, decimated by Old World diseases, replaced by Aztec and Tlaxcalan colonists, or acculturated through contacts with Mexican Indians, Franciscan and Jesuit missionaries, and Spanish and mestizo *encomenderos* during the sixteenth and seventeenth centuries that Mexican and foreign historians, philologists and anthropologists until recently wrote (primarily on the basis of place-names) of Sinaloa as an area whence or through which

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[1] The University of California field expedition of 1929–1930 with Carl O. Sauer in charge (Donald Brand, assistant, and A. L. Kroeber and Gottfried Pfeifer, part-time participants) carried out the first survey of the area. On the basis of this survey the University of California sent Isabel T. Kelly (assisted by F. S. Hulse) to Sinaloa, 1935, where excavations were carried out in the Culiacán and Chametla areas, and further testing was done by Kelly at Culiacán in 1939. In the years 1931 to date Sauer and, since 1939, Kelly have carried on surveys in Nayarit, Jalisco, Colima, and southwestern Michoacán, and some excavations have been made under the direction of Kelly. The Sinaloa work has been published as follows:

Carl Sauer and Donald Brand, "Aztatlán, Prehistoric Mexican Frontier on the Pacific Coast," *Ibero-Americana:* 1, 1932.

Isabel T. Kelly, "Excavations at Chametla, Sinaloa," *Ibero-Americana:* 14, 1938.

Isabel T. Kelly: Report on Culiacán excavations, in press since 1938 at University of California Press, Berkeley.

Isabel Kelly, "The Relationship between Tula and Sinaloa," *Revista Mexicana de Estudios Antropológicos*, t. V, Nums. 2–3, pp. 199–207, 1941.

In October of 1937 the American Museum of Natural History sent Gordon F. Ekholm into the Mexican West Coast area, where he and his wife carried out a survey of Sonora and northern Sinaloa, 1937–39, and excavated in the Guasave area, Sinaloa, as well as in Sonora. Published material on this work includes:

Gordon F. Ekholm, "Results of an Archeological Survey of Sonora and Northern Sinaloa," *Revista Mexicana de Estudios Antropológicos*, t. III, No. 1, pp. 7–10, 1939.

Gordon F. Ekholm, "The Archaeology of Northern and Western Mexico," *The Maya and Their Neighbors*, pp. 320–330, New York, 1940.

Gordon F. Ekholm, "Prehistoric 'Lacquer' from Sinaloa," *Revista Mexicana de Estudios Antropológicos*, t. IV, Nums. 1–2, pp. 10–15, 1940.

Gordon F. Ekholm, "Tula and Northwestern Mexico," *Revista Mexicana de Estudios Antropológicos*, t. V, Nums. 2–3, pp. 193–198, 1941.

Gordon F. Ekholm, "Excavations at Guasave, Sinaloa," *Anthropological Papers of the American Museum of Natural History*, Vol. 38, Pt. 2, 1942.

the ancestral Aztecs had migrated, or as an area tributary to the Aztecs of Tenochtitlán.[2]

Until 1925 all of the archaeologic literature either passed over Sinaloa, or listed only sites of petroglyphs—with the sole exception of Guillemin Tarayre's mention of artifacts at Mazatlán. Guillemin Tarayre was a French geologist who traversed northwestern Mexico in 1865–66 for the French Scientific Commission. In 1873 Commander George Dewey (the hero of Manila Bay), while with the U.S.S. Narragansett surveying Mexican waters for the Hydrographic Office, observed the shellmounds and remains of an Indian village near Chametla. The British geologist and engineer, O. H. Howarth, in 1893 noted petroglyphs and evidence for cremation in the coastal area between the rivers Piaxtla and Quelite. In 1898 the English-American botanist Edward Palmer collected some stone artifacts (axes, manos, chipped implements) near Topolobampo, and at about the same time or a few years later the American naturalist E. W. Nelson obtained some terra cotta vessels and figurines near Ahome. Palmer's and Nelson's collections are in the United States National Museum. During all of the period 1880–1925 many whole vessels, figurines, axeheads, metates and other artifacts were uncovered in the process of digging canals for the sugar haciendas (sugar cane raising in Sinaloa expanded greatly during the early years of the Pax Porfiriana, during the era of railroad building, and again in the 1920's), constructing railroads (Occidental 1880, Southern Pacific 1907–1910, K.C.M. & O. 1908–09), and in highway (main development 1921 to date) and other construction calling for excavation. These items were well known locally but never became known to professional archaeologists of the period, since these artifacts were rapidly lost or were distributed widely through gift and sale by the *hacendados*, engineers, and workmen. Probably the best collection of such provenience was that belonging to Don Diego Redo—housed partly in his Culiacán and Eldorado headquarters and partly in his Mexico City home. A few of these items are in the national museums in Mexico City and Washington, and probably others are in smaller museums, but the great bulk are lost to science. It was from the last great construction job in Sinaloa, the Canal Rosales in the Culiacán Valley (1920–25), that came the vessels and burials in ollas which occasioned Ing. Carlos Talancon's letter of January 20, 1925 to the archaeologist Alfonso Toro. The comments by Toro, based on this letter, in the *Anales del Museo Nacional* constitute the first professional archaeologic "recognition" of Sinaloa. At that time, Toro pointed out that all that was known from Sinaloa was pottery and petroglyphs.[3]

[2] Among the better historical and anthropological writings on Sinaloa are the following items and the sources utilized by them:

Hubert Howe Bancroft, *History of the North Mexican States, 1531–1889*. 2 vols., San Francisco, 1884–1889.

Leon Diguet, "Le Chimalhuacan et ses Populations avant la Conquête Espagnole," JSAP, n.s., 1: 1–57, 1903.

J. Lloyd Mecham, *Francisco de Ibarra and Nueva Vizcaya*. Durham, 1927.

Ralph L. Beals, "The Comparative Ethnology of Northern Mexico before 1750," *Ibero-Americana:* 2, 1932.

Carl Sauer, "The Road to Cibola," *Ibero-Americana:* 3, 1932.

Ralph L. Beals, "The Acaxee, a Mountain Tribe of Durango and Sinaloa," *Ibero-Americana:* 6, 1933.

Carl Sauer, "The Distribution of Aboriginal Tribes and Languages in Northwestern Mexico," *Ibero-Americana:* 5, 1934.

A. L. Kroeber, "Uto-Aztecan Languages of Mexico," *Ibero-Americana:* 8, 1934.

Carl Sauer, "Aboriginal Population of Northwestern Mexico," *Ibero-Americana:* 10, 1935.

[3] Some of the material in this paragraph is based on passing notes of seldom more than a sentence or two, e.g., Dewey, Palmer, and Nelson, in governmental reports. Most of the information has been gleaned from observations in museums and conversations with many individuals in the United States, Mexico, and even South America (several engineers, geologists and railroadmen who had worked in Sinaloa). Among the publications of more than one page are:

The regions adjacent to Sinaloa (southern Sonora, southwestern Chihuahua, western Durango, Nayarit) and those containing the possible routes of connection with the higher cultures of southern Mexico (Jalisco, Colima, Michoacán, and western Guerrero) have also been neglected archaeologically until recent years. Ruins in what are now Durango, Zacatecas, Aguascalientes, Jalisco, Michoacán, and Guerrero were reported in passing by the Spanish conquerors and missionaries of the sixteenth, seventeenth, and eighteenth centuries, and again by Mexican and foreign travelers and scientists in the first half of the nineteenth century, but no "dirt archaeology" was accomplished until the Diaz regime. Then, to mention a few of the outstanding events, in 1889 Plancarte excavated in northwestern Michoacán; Palmer in 1891 purchased some of the famous Ortices ceramics in Colima; Seler, Niven, Diguet and Starr commenced their ramblings over southwestern Mexico; Lumholtz in 1896 traversed portions of Nayarit, Jalisco, and Michoacán; Adela Breton in 1896–1897 visited archaeologic sites and obsidian quarries in Michoacán and Jalisco; Hrdlička collected in the Jalisco-Zacatecas country, 1898–1902; Batres visited La Quemada in 1903; Pepper excavated in southwestern Michoacán, 1904; Hewett traversed the entire eastern slope of the Sierra Madre Occidental in 1906; Gamio worked at Chalchihuites in 1908; Wallace Dillon "discovered" the Mexcaltitán area of coastal Nayarit, 1907–1908; and Mason collected in northern Jalisco, 1912. Numerous antiquarians and historians sprang up in the capitals of Nayarit (former territory of Tepic), Jalisco, Colima, and Michoacán, including such well-known names as León, Dávila Garibi, Santoscoy, and Galindo. After the Diaz regime there ensued the troubled period of revolutions which precluded much scientific and scholarly activity. A resurgence of interest and activity became manifest in western and southwestern Mexico during the 1920's, and this interest and activity has increased greatly in tempo during the past decade. Mexican governmental archaeologists, notably Eduardo Noguera, visited sites as far north as Casas Grandes, and excavations were undertaken within the basin of the Río Lerma and elsewhere, chiefly in northern Michoacán. The work of the California group in southwestern Mexico has been mentioned already. The University of Pennsylvania Museum and American Philosophical Society (J. A. Mason et al.) in 1936 surveyed and collected in Zacatecas and Durango. The University of New Mexico (D. D. Brand et al.) carried out reconnaissance in Durango in 1936 and Michoacán and Guerrero in 1939, and excavated in the latter two states in 1941. Local archaeologists, especially in western Michoacán, became very active. Jesús Martínez Guerrero, under the aegis of the Cárdenas family, commenced a survey of northwestern Michoacán in 1934 climaxed by the spectacular finds in excavations near Jiquilpan during 1940 and 1941. In southwestern Michoacán, Pablo Frich of Apatzingán carried on, for a number of years, excavations, the fruits of which constitute the most important collection in the displays of the Museo Michoacano. Michoacán owes much to the active interest in archaeology of two of its governors, Pascual Ortiz Rubio and Lázaro Cárdenas, both of whom became president of Mexico. Outside of considerable pothunting in Colima, and to a lesser extent in Jalisco and Nayarit, these three states have had little local archaeologic development. The above historical and bibliographic outline has been written so that the interested individual may read for himself and thereby place the following review in its proper context. The reviewer has felt that this was necessary, because in his own ex-

E. Guillemin Tarayre, *Rapport sur L'Exploration Mintralogique des Regions Mexicaines Suivie des Notes Archeologiques et Ethnographiques.* Paris, 1867, 1869.

O. H. Howarth, "On the Rock Inscriptions of Sinaloa," JAI, Vol. 23, pp. 225–232, 1894.

Alfonso Toro, "Una Nueva Zona Arqueológica en Sinaloa," *Anales del Museo Nacional de Arqueología, Historia y Etnografía*, 4ª Ep., t. 3, pp. 57–58, 1925.

perience there are exceedingly few American and Mexican archaeologists who realize that there is any "archaeology" in Mexico north and west of the Valley of Mexico.[4]

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[4] Unfortunately, aside from a few brief articles in ephemeral media, there exist few accounts of the archaeologic work, 1880–1942, in western and southwestern Mexico, from Durango to western Guerrero. Representative items are:

Hubert H. Bancroft, *The Native Races of the Pacific States, Vol. IV Antiquities.* San Francisco, 1883.

Nicolas León (edited, and many articles in), *Anales del Museo Michoacano,* 3 vols., Morelia, 1888–1891.

Francisco Plancarte y Navarrete, "Archaeologic Explorations in Michoacán, Mexico," *American Anthropologist,* o.s., Vol. 6, pp. 77–84. 1893.

Frederick Starr, *The Little Pottery Objects of Lake Chapala, Mexico,* University of Chicago, Department of Anthropology Bulletin 2, 1897.

Frederick Starr, "Stone Images from Tarascan Territory, Mexico," *American Anthropologist,* o.s., Vol. 10, pp. 45–47, 1897.

Léon Diguet, "Note sur Certaines Pyramides des Environs d'Ixtlan (Mexique)," *L'Anthropologie,* t. 9, pp. 660–665. 1898.

Carl Lumholtz and Ales Hrdlička, "Marked Human Bones from a Prehistoric Tarasco Indian Burial Place in the State of Michoacan, Mexico," *Bulletin of the American Museum of Natural History,* Vol. X, pp. 61–80, 1898.

Carl Lumholtz, *Unknown Mexico.* 2 vols., New York, 1902.

Leopoldo Batres, *Visita a los Monumentos Arqueológicos de "La Quemada," Zacatecas.* Mexico, 1903.

Ales Hrdlička, "The Region of the Ancient 'Chichimecs,' with Notes on the Tepecanos and the Ruin of La Quemada, Mexico," *American Anthropologist,* n.s., Vol. 5, pp. 385–440. 1903.

Nicolás León, *Los Tarascos.* Mexico, 1904.

Adela Breton, "Some Obsidian Workings in Mexico," *Proceedings Thirteenth ICA, 1902,* pp. 265–268, New York, 1905.

Eduard Seler, "Die Alten Bewohner der Landschaft Michuacan," *Gesammelte Abhandlungen,* Vol. 3, pp. 33–156, Berlin, 1908.

Manuel Gamio, "Los Monumentos Arqueológicos de las Inmediaciones de Chalchihuites, Zacatecas," *Anales del Museo Nacional,* 3ª Ep., t. 2, pp. 469–492, Mexico, 1910.

H. J. Spinden, "An Ancient Sepulcher at Placeres del Oro, State of Guerrero, Mexico," *American Anthropologist,* n.s., Vol. 13, pp. 29–55, 1911.

George H. Pepper, "Yacatas of the Tierra Caliente, Michoacán, Mexico," *Holmes Anniversary Volume,* pp. 415–420, 1916.

Pascual Ortiz Rubio, *Historia de Michoacán.* Morelia, 1920.

Miguel Galindo, "Bosquejo de la Geografía Arqueológica del Estado de Colima," *Anales del Museo Nacional,* 4ª Ep., t. 1, pp. 165–178, 1922.

Ramón Mena and Porfirio Aguirre, "La Nueva Zona Arqueológica, Chupicuaro, Guanajuato," *Revista Mexicana de Estudios Históricos,* t. 1, pp. 55–64, 1927.

Marshall H. Saville, "Ceremonial Axes from Western Mexico," *Indian Notes,* Vol. 5, pp. 280–293, 1928.

Eduardo Noguera, *Ruinas Arqueológicas del Norte de Mexico.* Mexico, 1930.

Alfonso Caso, "Informa Preliminar de las Exploraciones Realizadas en Michoacán," *Anales del Museo Nacional,* 4ª Ep., t. 6, pp. 446–452. Mexico, 1930.

Eduardo Noguera, "Exploraciones Arqueológicas en las Regiones de Zamora y Patzcuaro, Estado de Michoacán," *Anales del Museo Nacional,* 4ª Ep., t. 7, pp. 89–103, 1931.

F. Medina de la Torre, "Monumentos Arqueológicos en el Oriente del Estado de Jalisco," *Boletín de la Junta Auxiliar Jalisciense de la Sociedad Mexicana de Geog. y Estad.,* t. 3, pp. 217–226, 1934.

José Ramírez Flores, "La Arqueología en el Sur de Jalisco," *Boletín de la Junta Auxiliar Jalisciense de la Soc. Mex. de Geog. y Estad.,* t. 4, 1935.

H. D. Disselhoff, "Trachtstücke und Geräte der Bewohner das alten Colima," *Baessler Archiv,* Vol. XIX, Pts. 1–2, pp. 16–21, 1936.

J. Alden Mason, "Late Archaeological Sites in Durango, Mexico, from Chalchihuites to Zape," *Twenty-fifth Anniversary Studies, Philadelphia Anthropological Society,* Vol. 1, pp. 127–146, 1937.

Donald D. Brand, "Notes on the Geography and Archaeology of Zape, Durango," *So Live the Works of Men, Seventieth Anniversary Volume Honoring Edgar Lee Hewett,* pp. 75–105, Albuquerque, 1939.

Daniel R. de la Borbolla, "Antropología Tzintzuntzan-Ihuatzio," *Revista Mexicana de Estudios Antropológicos,* t. 3, pp. 99–121, 1939.

Jorge R. Acosta, "Exploraciones Arqueológicas Realizadas en el Estado de Michoacán durante los Años de 1937 y 1938," *Revista Mexicana de Estudios Antropológicos,* t. 3, pp. 85–98, 1939.

Donald D. Brand, "Recent Archaeologic and Geographic Investigations in the Basin of the Río Balsas, Guerrero and Michoacán," *Proceedings Twenty-Seventh ICA, 1939,* Mexico, 1943.

THE EXCAVATION

Ekholm, assisted by his wife, made an archaeological survey of Sonora and northern Sinaloa, 1937–1939, for the American Museum of Natural History. The Guasave site was discovered in May of 1938, and parts of three seasons were devoted to its excavation. This site, a burial mound known locally as El Ombligo, lies within one hundred meters of an abandoned river channel less than a mile west of the present course of the Río Sinaloa and about three miles south of the town of Guasave, on the road to Tamazula.[6] The mound, within the rancho El Dorado, occupied the highest point on the alluvial plain for a radius of two or three miles, and at its highest point stood about five feet above the surrounding fields. Although roughly oval in shape, with major axis nearly NNE-SSW, cultivation, leveling and other recent disturbances on the south side precluded any accurate portrayal of original shape and contours. The bulk of the excavations were carried out in the northern intact and originally highest part of the mound. An irregularly shaped area, approximately 67 by 105 feet, was excavated down to about six feet below a base level that was at approximately the level of the surrounding fields. Throughout the excavation practically no change was found in soil color or texture until a culturally sterile horizon of sticky clay was encountered. There was found no evidence of any habitation structures, nor did stratigraphic sampling of sherds reveal any significant differences from one level to another. Nearby sherd areas, in which eleven test trenches yielded nothing new, seemingly marked the habitation sites of the people who built the burial mound.

After giving the information that has been summarized above, Ekholm proceeds in an able and lucid manner to discuss burials, ceramics, metals, stone objects, shell objects, bone objects, perishable materials, foods, skeletal material, and miscellaneous data for eighty-four pages. Comparative material and some theoretical considerations, as well as simple description, are included in these sections, but these are summarized in ten pages of conclusions, followed by a section on Middle American-Southwestern relationships. The report ends with three pages of bibliography.

One hundred and sixty-six complete burial units and twenty-one fragmented skeletons were found. The bones in general were very poorly preserved. The majority (127) of the skeletons were lying on the back, with legs extended and arms at the sides. There was a time differentiation (from depth of burial) as to orientation, with a tendency to bury with head to the south (51) being earlier, and with head to the north (70) being later. The only marked difference in funerary furniture was the paucity of vessels with the head-to-the-south burials, but the two vessels found and the other artifacts showed no significant changes. Upright vessels placed around the burial, and at the same level, constituted the bulk of the furniture. With the higher head-to-the-north burials, vessels ranged in number from two to eighteen. Eleven secondary bundle burials were found, unaccompanied by offerings, and in both upper and lower levels. Twenty-eight large

[6] For geographic background, in addition to Sauer and Brand: *Astatlán*, already cited, the interested reader would profit from:

P. L. Bell and H. Bentley Mackenzie, *Mexican West Coast and Lower California*. D.C., Special Agents Series 220, Washington, 1923.

Leo Waibel, "Die Nordwestlichen Küstenstaaten von Mexico," *Geographische Zeitschrift*, Vol. 33, Leipzig, 1927.

Juan L. Paliza, *El Estado de Sinaloa*. Culiacán, 1928.

R. de C. Ward and Ch. Brooks, "The Climates of North America: Mexico," *Handbuch der Klimatologie*, Vol. II, Pt. J, Berlin, 1936.

Donald D. Brand, "Notes to Accompany a Vegetation Map of Northwest Mexico," *University of New Mexico Bulletin* 280, 1936.

Gottfried Pfeifer, "Sinaloa und Sonora," *Mitteilungen der Geographischen Gesellschaft in Hamburg*, Vol. 46, pp. 289–460, 1939.

ollas, containing secondary burials, were found—mainly near the surface. There was some evidence for decapitation, keeping of head or skull trophies, and use of red ochre on trophy skulls. Ekholm notes the lack of secondary urn burial in the American Southwest and Sonora, and its commonness in Sinaloa and presence in Michoacán. In his field notes of 1930 the reviewer finds reports (unconfirmed) of olla burials near Corerepe, Bamoa, Sinaloa and Mocorito, in the general Guasave area, in addition to the locations published by Sauer and Brand, Kelly, and Ekholm. It is also known in Nayarit, Jalisco and Guerrero. Cremation in Sinaloa is denied by both Ekholm and Kelly. Certainly no evidence for it has appeared in the excavations to date, but it may have obtained in some parts of the area, since Howarth reported it near the Piaxtla in 1893 and the reviewer recalls seeing one partially exposed olla with apparently calcined bones in the lower Presidio valley. The nearest areas known to have cremation are northern Sonora, Durango, Jalisco, Michoacán and Guerrero. In much of Mexico, cremation appeared during the Toltec or Teotihuacán period, and quite often was apparently restricted to certain individuals under circumstances varying from the ordinary. Various forms of inhumation and secondary olla burial dominate from Sinaloa to Guerrero, in western and southwestern Mexico. Ekholm cites late flexed burials from Cholula oriented south-north. In addition might be mentioned north-south inhumations from the Apatzingán area, Michoacán, and, from the University of New Mexico Lake Chapala excavations of 1941 (Cojumatlán, Michoacán), a variation among orientations of sixteen burials (7 west-east, 4 south-north, 1 east-west, 1 north-south, 1 seated, and 2 unidentifiable) with no significant level or furniture differences. This would indicate that orientation of inhumations may not be of much critical value in western Mexico.

More pottery was found than all other classes of objects. One hundred fifty-five whole or nearly whole vessels were recovered, and several thousands of sherds (no totals or distribution of types by percentages were given). All of the pottery was identified as of probable local manufacture, or at least of provenience from within Sinaloa. Ekholm believes he found evidence for three ceramic strains or complexes: (1) a pottery complex from central and southern Sinaloa; (2) a plain redware strain indigenous to southern Sonora and northern Sinaloa; and (3) a strain, represented mainly in design similarities, derived from the "cultures of the central highlands." Some twenty to thirty pottery types were described, to seventeen of which were given formal specific names, e.g., Guasave Polychrome. Twenty-seven major headings were utilized in describing the various types, which were based on from one whole vessel to a large but unspecified number of whole vessels and thousands of sherds. In general, except for the coarse monochrome types, the paste was medium fine, and the temper was seemingly a fine-grained sand—commonly white in color and abundant. Paste color, thickness, and hardness varied considerably. The three main ware groupings were monochrome, duochrome, and polychrome. The monochrome is chiefly red, brown, buff, black, and white. Duochrome consists predominantly of red or brown on brown, buff, or cream. The colors found on polychrome are as follows: black and red on buff, brown-red, brown-buff, and white combinations, and black, maroon-red-brown, brown-buff, and white combinations. Redware, red-on-buffware, and three polychromes (Navalato polychrome, black and red on buff; Guasave polychrome, black, red, and white on buff; Sinaloa polychrome, maroon, black, and white on brownish-buff) dominate their respective classes or groupings. The slips and paints are frequently fugitive, especially in the polychromes. No chemical or microscopic determinations of slip, temper, paint, or paste were published. In addition to painting (in from one to three or four colors), surface decoration included incising, grooving, and gadrooning. There was no applique. Surfaces were unslipped, slipped on one or both sides, matte, polished, and burnished. Incision was employed on monochrome, duochrome, and polychrome wares, but was most common on monochromes. Tripod legs were quite common, and were present on most types—varying from a minor incidence to presence on all vessels of a type. The legs were commonly short, globular

or subconical, hollow with rattles, or solid, and lacking in modeling. No tetrapod, zoomorph, stepped, cubical, cylindrical, or long legs were reported. The more common forms were bowls, which may be open or have vertical rims or incurved rims, jars, which occur in a wide range from tall vase-like forms to globular, and some oval and scoop shapes. Plates, grinding bowls for chile, cylindrical jars, and colanders were lacking. Effigy or modeled forms were rare; only one small vessel with a moulded animal-head on the side was found. However, to the reviewer it seemed that at least one attempt to represent a cucurbit was illustrated in the Guasave redware.

Ekholm is to be congratulated on the care and ability with which he described, illustrated, and analyzed the pottery designs. He has so successfully depicted the great variety of design elements that the reviewer must be content with a general statement of range and dominant characteristics. The only recourse for the interested reader is to consult the illustrations in the original, which are quite satisfying except that colors are indicated by conventional hatchings, stipplings, and shadings in black and white. Probably decorated vessels (painted and incised) comprised somewhat less than half of the total from Guasave. The bulk of the undecorated vessels were Guasave redware and "heavy red and plain wares." The latter were used for burials and as the common utility pottery. The decorated vessels deposited as grave furniture probably included both better-class utility and ceremonial wares. Most of the decorative designs, both painted and incised, were arranged in bands and panels on exteriors and upper interiors; and the bottoms of open vessels were commonly occupied by one-unit motives, or were halved or quartered. The simplest and most common element in painted wares was a painted rim. The majority of the design elements were conventional and geometric, both rectilinear and curvilinear, which varied from very stiff and formalized figures to sub-naturalistic and symbolic designs. Among the more common elements were bands, checkerboard elements, hatchings, triangles (open, hatched, solid), mazes, spirals and scrolls, circles and dots. Naturalistic and semi-naturalistic designs, although not numerically important, were present to a significant degree. These varied from vague leaf and feather-like elements to definite plant and animal forms. Some of the zoomorphs are considered by Ekholm to represent deities. A number of the "deities" and associated elements certainly bear very close resemblance to various representations on codices from the Mexico-Puebla-Oaxaca area. Ekholm's comparisons and conclusions in this regard will be considered later in the review.

Clay objects other than pottery embraced pipes, masks, spindle whorls, earplugs, one cylinder stamp, plaques, figurines, one whistle, and beads. Eight complete pipes and forty-five fragments were found. These were approximately right-angle elbow pipes, with platform and high bowl, which ranged in decoration from unslipped to painted, burnished, and incised. Two parrot-like gray-slipped masks were found in the excavations, and these conceivably could have been worn. The thirty-six spindle whorls varied from unslipped brown and black to slipped red in color, were decorated with geometric incised figures, and were commonly of a sub-conical shape (curve-based, truncated, etc.). Three brown-black polished tubular ear-plugs were found with one burial. The find of one cylinder stamp with geometric pattern extends the known range of such stamps from the Culiacán to the Sinaloa valley. Three fragments of incised tablets were found, and these are described as plaques. Two of these were lightly incised and, since one had a perforation, possibly were worn as pendants. The third strongly-grooved "plaque" reminds the reviewer of similar objects he has seen in Sinaloa, Michoacán, and Guerrero, and which he has thought of as stamps. The one human figurine was found on the surface, and possibly never was more than a head. Its type is nondescript, in terms of known Mexican figurines. Ekholm also found fragments of three small animal figurines, possibly broken off from the legs or spouts of vessels. The fragment of whistle, and the small disc beads have little diagnostic value.

Remains of painted gourds were found with thirty-four of the burials. Usually only

the paint layers, and none of the gourd, were preserved, but the original shape seemed to have been that of a hemispherical bowl. The technique was that of pseudo-cloisonné or of modern Tarascan "lacquer." As many as six colors were used (gray, orange, red, turquoise-blue, yellow, white), and the decipherable designs were mainly geometric, although one seemed to be a stylized feather ornament. Here Ekholm provides a valuable listing of the known finds of paint cloisonné (as apart from plaster and lacquer forms). To this list (which includes sites in Arizona, New Mexico, Zacatecas, Jalisco, modern Michoacán and Guerrero, Valley of Mexico, Yucatán, and Perú) can be added at least archaeologic sites in western Michoacán, which likewise contain examples of in-fresco decoration. On the premise that all datable stepped grecques are no earlier than the Chichimec period, because these grecques appear on Jaliscan and Zacatecan material, and on the assumption that all the paint cloisonné on pottery of western Mexico is closely linked in style and technique, Ekholm concludes that the technique cannot be earlier than about 1100 A.D. In a footnote, however, he admits possible earlier dates.

Metal objects consisted of 134 items of cast copper, three pieces of galena, some particles of molybdenite, and beads of iron pyrites. One hundred and fourteen copper bells were found with the burials. Of these, 111 were small round bells with rings for attachment. Eight-seven were found tied in a row and wound around the ankle of one skeleton. There was also evidence for use of bells in necklaces and armlets. These bells varied in diameter from .8 cm. to 2 cm. The clappers were small pebbles. There is evidence that the wirework technique was used in casting these bells. Two unusual bells with straight shafts and a large specimen of the common type also were found. Other copper items included an ear-spool (?), a finger ring, a necklace containing twelve tubular beads and five "buttons," and one piece of flat plate. It is an open question whether the copper was cast in the area or imported. Ekholm, despite the fact that copper apparently was not worked in the Valley of Mexico and Oaxaca in pre-Aztecan time, is willing to allow an earlier date in southwestern Mexico south of Sinaloa.

Stone objects were not numerous, but those found afford bases for interesting speculations. There were found a vase, a jar, a figurine (?) and a fragment of alabaster. Of Mexican onyx or *tecali* were a fragment of a cylindrical vessel and a tube of unknown purpose. Ekholm correctly points out that Mexican onyx is not true onyx (a quartz) but a banded calcite or calcium carbonate, but the reviewer must object to the statement that objects of Mexican onyx have not previously been found on the west coast of Mexico, and to the conclusion that Sinaloa objects probably came from as far away as the present chief source in the state of Puebla. A fine effigy bowl of *tecali* or Mexican onyx was found some fifteen or more years ago during the digging of canals on El Dorado hacienda in the San Lorenzo valley, and was last heard of in the Don Diego Redo estate in Mexico City. There are known deposits of banded calcite in Puebla, Guerrero, and Jalisco, and reportedly in southern Sinaloa, as well as in Zacatecas, Durango, Coahuila and Baja California. The reviewer believes that northwestern Guerrero or central Jalisco, both being on ancient east-west roads and nearer than Puebla, merit consideration as possible sources. Alabaster, by definition, may be either calcite or gypsum; in fact, the term seemingly was first applied to certain of the calcites. Accepting the definition of alabaster as a fine-grained, sub-translucent to opaque calcium sulphate, there have been several more finds of archaeologic alabaster items than mentioned by Ekholm for Mexico (Guasave and Tepic), as for example at Jiquilpan, Michoacán, and near Tetela del Río, Guerrero. He is probably correct in assuming a western Mexican provenience for Sinaloa items, since alabaster has been reported from Sinaloa, Sonora, Baja California and Chihuahua, as well as from Tamaulipas, Guerrero and Puebla. Seventeen pendants and eighty-two beads of turquoise also were found. Although Ekholm accepts the current thesis that the bulk of turquoise objects found in Mexico south of the border states were made from Mexican turquoise, he is disposed to consider the Guasave turqoise of southwestern United States origin on typological grounds (Southwestern type of pendant)

and because of a report claiming that Guzmán, while in Sinaloa, heard of Indian traders who went on journeys of forty days to the north to exchange fine feathers for ornaments. This is possible, since there are sixteenth century reports of turquoise trade into northern Sonora, and because of prehistorically worked turquoise mines in southern Arizona and New Mexico. But Nuño Guzmán got the above-mentioned report while in the Huaxteca on the other side of Mexico, and there are known turquoise deposits not only in Durango and Sonora but also in Zacatecas, Baja California, and Guerrero, as well as possibly in Oaxaca and Chiapas. The real solution, as Ekholm suggests, lies in careful mineralogical analysis of various turquoises and their matrices. Turquoise commonly is found in a limonite matrix (also quartz, feldspar, and kaolin), but the impurities in this are quite variable.

Other stone items found include obsidian blades, a red stone pipe, varied small ornaments, metates, manos, one vesicular lava pestle, axes, two arrow-shaft polishers, two balls, a doughnut-shaped ring of sandstone, two polishing stones or smoothers, two granular slate whetstones, and two notched pebbles or weights. Chipped stone implements were entirely lacking at the Guasave site. The three complete and four fragmentary four-sided obsidian blades were of the common south Mexican type. Ekholm's logical assumption is that the blades probably were brought from the highlands to the south, since cores have not been reported from Sinaloa. However, it does not follow that obsidian blades were "unknown in Sinaloa before the coming of the Mixteca-Puebla peoples," since, to the reviewer's best knowledge, obsidian blades are found in all levels of prehistoric agricultural cultures in Mexico from Jalisco to Oaxaca. Furthermore, the three largest known obsidian workings in Mexico are in Hidalgo, Michoacán and Jalisco. The metates, all fragmental, were seemingly large slabs of vesicular lava, "somewhat concave from end to end and horizontal from side to side," with no evidence for legs. Ekholm rightly states that this type of metate, with accompanying long and slender mano, is unknown in the southwestern United States and is similar to the form used in central Mexico. In the reviewer's opinion the "center of gravity" of this type falls somewhere in southwestern Mexico, possibly in southern Michoacán. No axes came from the excavations, but fourteen were gathered from the surface in the vicinity. Four of the axes were crude celts; ten were three-quarter grooved axes, one of which was an effigy. Ekholm believes that the mixture of types in western Mexico is explained by a movement of the celt north from Middle America and a movement of the grooved axe south out of the southwestern United States. The reviewer would agree with a Middle American origin of the celt, but considers the three-quarter and fully grooved axes to be of Mexican origin. The celt is dominant northwestward to a diagonal line cutting across central Guerrero and Michoacán. Northwest of this line grooved axes, chiefly of three-quarter type, dominate well into the American Southwest, and celts are decidedly a minor type, even in southwestern Mexico. It is possible that a series of migrations northward took place, possibly 300 A.D. or earlier to 700 A.D., from southwestern Mexico into the American Southwest. During the earlier migrations, into the Gila-Sonora region, (Trincheras, Hohokam, Mogollon, etc.) such elements as maize culture; cotton culture; cremation; red, brown, and red on brown or buff pottery; and grooved axes were carried. Certainly a perfected polished three-quarter grooved axe appears in the Hohokam region during the Snaketown phase with no local antecedents or possible nearby provenience. The later migrations, probably around 500 A.D. to 700 A.D., continued farther to the north and east, where these peoples amalgamated with Basketmaker and Plains elements to produce the Basketmaker III (Modified Basketmaker)-Developmental Pueblo (Pueblo I and II) era and culture characterized by the introduction of such new elements as grooved axes, cotton, domesticated turkey, slab-in-bin metates (conceivably a modification of the legless Mexican type without lateral ridges), and a new physical type much closer to the Indians of southwestern Mexico than to the prior-existing strains on the Anasazi plateau. Certainly most botanists and zoologists will

agree that the domesticated variety of turkey and cotton derived from Mexican stock.

Shell was extensively used for ornaments such as beads, pendants, bracelets, tinklers, plaques, etc. Beads were disc, bi-lobed, dentiform, globular, and tubular. Bracelets and plaques seemingly received the most carved ornamentation, but all of the work was crude. Due to the slight amount of published material on shells in Mexico Ekholm was forced to make most of his comparisons with the Hohokam area. Actually a wealth of shell material has been found in Mexico and some of it (for example, Apatzingán and Jiquilpan) is of exceedingly high quality. Bi-lobed beads and bracelets with carved animal figures have been found in Michoacán. It is a pity that no more exact determination of species was obtained (clam, conch, *Vermetus*, bivalve, "more elongated shells"), since many trade connections often can be proved when species and habitat-range are known. The reviewer would have expected a fair representation of such genera as *Cardium*, *Arca*, *Pecten*, *Donax*, *Ostrea*, *Chione*, *Turitella*, *Melongena*, *Oliva*, *Olivella*, and *Strombus*.

Only three bone artifacts were found, and seemingly these were used as daggers. Possibly Ekholm's belief that bone in Middle America compared with the Anasazi region was little used for tools can be explained by three factors: (1) much more careful archaeology, including the cataloging of unprepossessing pieces of bone, has been done in the Southwest than in Mexico; (2) probably a greater number and variety of animals with usable bones existed in the Southwest than in the more densely populated Mexican areas; and (3) most of the known archaeologic cultures in southern and central Mexico practised more intensive agriculture than obtained in the Southwest. Nevertheless, the reviewer has seen numerous awls, flakers, etc. of deer, turkey, and other bones in Mexico in the states of Mexico, Guerrero, Michoacán and Oaxaca.

Perishable materials included textiles, cord, and basketry. A few fragments of canvas-like cotton cloth with a single over-and-under weave were preserved through contact with copper artifacts. Cotton also was used in making cordage. Evidence was found for coiled baskets and twilled mats. From the contents of a few bowls it was determined that possibly insect eggs and certainly fish had been placed in them as food for the dead.

The skeletal material, poorly preserved as it was, yielded some information. Persons of both sexes and all ages were buried in the mound. The skulls were uniformly brachycephalic, and the group was relatively tall. Cranial deformation was predominantly frontal flattening, and there was some plain occipital and lambdoidal deformation. Tooth mutilation, consisting of simple filing, was noted in at least fifteen individuals. Distal filing and notching (Borbolla's types J and A) were dominant, the presence of J type possibly indicating a connection with the Puebla-Oaxaca area. The use of a pitch or bitumen to color the teeth was observed in three instances. Several extra skulls, coated with red paint, were found, and these were interpreted as trophy skulls. Extra skulls have been reported from elsewhere in western Mexico, but the red ochre dyeing has not always been present although reported for Michoacán.

In summary, Ekholm points out that there was little tangible evidence for cultural changes, other than in burial type and orientation; evidently the area was not inhabited long and the material can be considered part of one phase termed the Guasave culture; no evidence of houses was found, although there were numerous remains of ovens and fire-pits.

The final fourteen pages contain conclusions that embrace archaeologic factors from Oaxaca to Arizona. Ekholm has courageously set forth some conclusions and theories that are both stimulating and challenging. These may be summarized as follows:

1. On the basis of areal surveys and Kelly's Chametla dig, there is postulated a basic Sinaloa painted ware culture, tentatively placed contemporary with late Teotihuacán of Central Mexico, with a possible origin in the "western highlands" and extension only through southern Sinaloa. Selected elements include plain bowls without feet; simple geometric designs; incised bands; red-on-buff, and red, black, and white on buff painted

decoration. This postulation seems to overlook the possibility that the Tacuichamona piedmont culture, from which there are no excavated remains, may be not only cruder but also older than any other ceramic culture in Sinaloa. The Tacuichamona culture, as known, is characterized by punched decoration of pottery, red-on-buff and black-on-red-on-buff painted wares, pipes, and crudely worked stone idols. Furthermore, since there have been excavations only in three widely separated areas, the chances of finding horizons antedating Early Chametla in the lower levels of some of the lowland sites seem to be good. Synchronization with Late Teotihuacán, of course, can be little more than an informed guess, which may be off by several cultural phases or periods. The origin, in time and area, of the Sinaloa red-on-buff complex is a problem the solution of which may untangle many other knotty problems in western Mexico. Kelly, Ekholm and Brand already have perceived certain general resemblances in colors, designs and shapes among a number of red or brown on buff, yellow, or brown wares in western Mexico. It is possible that there exists a genetic relationship of varying closeness within this whole duochrome series from Hohokam, Dragoon, Mogollon, Trincheras, and Sonora, through Sinaloa, Durango, Zacatecas, Jalisco, and Lake Chapala, to Matlatzinca, Mazapan, Coyotlatelco, and Mixteca. Only at the northwest and southeast have these wares been dated, with Hohokam at possibly 300 A.D. and Mazapan, Matlatzinca, and Coyotlatelco around 1100 A.D. Ekholm hazards a point of origin for the red-on-buff pottery "somewhere in western Mexico," and the reviewer would agree and would select the general area between the Lerma and the Balsas rivers, or in the vicinity of Lake Chapala.

2. Another basic culture is postulated, the Huatabampo redware culture of southern Sonora and northern Sinaloa, which is characterized by redware, incised ware, legless bowls, swollen-neck jugs, etc. Ekholm suggests that this culture is largely of local development with some influence from both Middle America and the Southwest. Its possible extension is thought to be from the Mayo to the San Lorenzo. If it were not for the present seeming gap between central Sinaloa and Jalisco, one might derive this redware culture from the Jalisco-Colima-western Michoacán region, since there are many vessels quite similar in form and color obtained from this region. Another guess, which Ekholm has fathered in part, is that the ancestral Cahitas in northern Sinaloa developed this ceramic culture. The reviewer recalls being told by natives between Guasave and Ahome that the redware in the *monte* was of the "ancients," and also that in the Fuerte valley he was informed that the Mayos formerly made a redware. A redware is still manufactured in Imala above Culiacán, and prehistoric potsherds of redware are to be found at El Palmito near Culiacán and near La Cruz on the Elota river. It is possible that the early Cahita brought this redware south, since the Cahitas at the time of the Spanish conquest occupied Sinaloa down to the Piaxtla river, next south from the Elota. It must be kept in mind that not only the comparatively savage Mayo, Ocoroni, and other peoples of the Fuerte-Sinaloa region were Cahita but so also were the more cultured Tahue who possessed the so-called Culiacán culture.

3. On the basis of a religious ceremonial complex, expressed chiefly through design motives on ceramics, Ekholm brings an immigrant group from the Mixteca-Puebla region into Sinaloa and considers them as the influence which improved design and technique in the old Sinaloa culture and thus gave rise to the Aztatlán complex. This Aztatlán complex apparently was the most wide-spread culture to exist in Sinaloa. Its range was from the Fuerte south into Nayarit. The Guasave culture revealed by the Guasave excavations constituted a phase of the Aztatlán similar to the Aztatlán phases at Culiacán and Chametla revealed by Kelly's excavations, but individualized by the presence of the Huatabampo strain. Ekholm explains the great diversity of artifacts and pottery types at Guasave as an expression of the recent fusion of three distinct strains, or cultures, Sinaloa, Huatabampo and Mixteca-Puebla. Although Ekholm candidly admits that such an outstanding role for Mixteca-Puebla culture "is in large part pure speculation,"

since we yet know so little concerning the archaeology of the Mixteca-Puebla area and of the regions between it and Sinaloa, nevertheless he has done an excellent job with the material available. Ekholm has listed forty-five central Mexican and Central American traits at Guasave (fourteen ceramic traits, general; eighteen ceramic traits, design motives; and thirteen other traits) with their known range or center of development. Although one might question nearly all of the general and other traits, nearly all of the design motives, within the knowledge of the reviewer, are correctly identified in the Guasave material and most probably emanate from the Mixteca-Puebla area. These motives include paintings of gods, conventionalized feathered serpent, solar symbol motive, downy feather ball, symbol of the Wind God, jaguar skin motive, tree motive, flint knife motive, three-petalled flower, sinuous arms, feathers and balls, blood symbols, heart, and tied elements. As Vaillant has pointed out, approximately during the Chichimec period (about Teotihuacán V to Aztec I inclusive), from the Mixteca and the Cholula regions there entered the Valley of Mexico most of the ritualism, religious mythology, calendar system, and system of picture writing that are commonly considered Aztec. Some of these elements undoubtedly spread far to the west and north. Ekholm accepts Vaillant's dates of 1100 A.D. to 1300 A.D., and has a Mixteca-Puebla group or tribe actually migrating all the way to Sinaloa. The reviewer would question the dates because they are based on "dead-reckoning" plus shaky tradition and because he feels that a number of the so-called Mixteca-Puebla elements are older than that in parts of western Mexico, and he would question the movement of a considerable body of people. Ekholm recognizes the difficulties of such a long trip, but believes the migrants could have by-passed heavily settled areas. Part of this problem depends on the dates when the Purepecha (Tarascan), Coliman and other of the stronger "kingdoms" of the west were organized, and upon the attitude they would take toward strangers. The first two entities alone could bar any movement, either via the Lerma-Chapala-Río Grande de Santiago-barrancas route or via the Balsas-Tepalcatepec-Sayula-Ameca-barrancas route. It is understandable how a few wandering traders, artisans, or travelers might get to Sinaloa, settle down, introduce a few ceramic designs, and leave little other impression, but it is difficult to believe that a whole sib, tribe, or large group could migrate without introducing other things to which they had been accustomed, such as stone architecture, sculpturing, figurines, representations of such gods as Tlaloc, religious centers, platforms, censers, calendar, writing, heirlooms of jadeite (their most prized stone), avocado, cacao, sweet potato, peanut, etc., etc.

4. The Aztatlán phase is given a possible span from 1350 A.D. to 1400 A.D. After this the savage Cahita killed off or drove south the people of Guasave. Probably such took place, but the dates seem to be based on too many mutually dependent assumptions.

5. With respect to Middle America-Southwestern relationships, the Guasave excavation provided but little new light. However, Ekholm states a general theoretical solution to the problem of connections. Accepting Gladwin's and Vaillant's dates, both the early Hohokam and the Archaic in the Valley of Mexico had maize and pottery about the same time, thus precluding any derivation of one culture from the other. Therefore, an earlier horizon possessing both maize and pottery from which both cultures were derived is postulated. Ekholm would allow this horizon to develop "in some region which was geographically more favorable for the early stages of the development of agriculture," chiefly on the basis of maize. Although botanists and anthropologists attribute the domestication of maize and the beginning of agriculture in the Americas to areas all the way from Mexico to Paraguay, and Mangelsdorf and Reeves have come out for a South American origin, the original locale of maize is still unknown and agriculture may have begun independently at different places and times. The reviewer believes that if maize culture or agriculture originated in any part of Mexico, this probably was in the *tierra templada* between elevations of 3000 and 6000 feet in the valleys and basins flanking the great volcanic axis from Nayarit and Jalisco to Vera Cruz and Puebla. The traits

and requirements of the native cultivated plants, such as maize, cotton, and kidney beans, indicate their origin on the Pacific rather than the Atlantic slope, since these native crops by growth habits and demands indicate their need for or adaptation to the shorter rainy season, smaller total rainfall, more marked dry season, and non-acid and sometimes alkaline soils that prevail on the Pacific slopes. Therefore, the area whence sprang the Archaic culture may lie in Morelos, southwestern state of Mexico, Michoacán, or Jalisco. Among the first to state this idea was Carl Sauer in 1936 and 1941. Such a possibility should be investigated rigorously, since the materialization of this possibility would alter many current interpretations of data already in hand. Having theoretically solved the problem arising from early Hohokam-Middle American contacts, Ekholm poses the problem inherent in the evidence for later contacts—the possession by the two areas of a number of common cultural elements, despite a seeming hiatus between the two cultures in Sonora. By what route, when, and in which direction did such common elements as ball courts, mosaic mirrors of iron pyrites, paint cloisonné, tripod and tetrapod vessels, cast copper bells, and shell and turquoise mosaics move? Ekholm writes off turquoise mosaics as early in both areas, seemingly the result of diffusion from one area to the other, but with "no way of knowing in which direction it went." Ekholm then accepts Gladwin's premise that, excluding tripod and tetrapod vessels, all the other listed traits were earlier in the Hohokam area than in Mexico, and suggests that, due to a paucity of archaeologic work in Mexico, this earliness is more apparent than real. The reviewer would add that most of Gladwin's early dates are sheer guesswork or "dead-reckoning" which have been recanted in part, and that similarity of form need not connote genetic relationship: for example, the Southwestern ball courts that the writer has seen are no more like the ball courts of the Mexican plateau or the Maya country than a base*ball* diamond is like a foot*ball* field. Furthermore, there is a strong possibility that the ball courts at Tula, Xochicalco, Jiquilpan and elsewhere on the plateau are earlier than hitherto believed. Ekholm concludes with the opinion that the "later" contacts must have occurred over large tracts populated by relatively primitive peoples, that these contacts must have been accomplished in large part by small groups of travelers, and that more attention should now be devoted to determining the depths of cultures "at the northern periphery of the high cultures in the plateau, in Zacatecas and Durango or even in Jalisco and Michoacán." To this last the reviewer says "amen!"

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Archaeological Researches in the Northern Great Basin. L. S. CRESSMAN AND COLLABORATORS. (Carnegie Institution of Washington Publication 538, pp. xvii, 158, 102 figs. Washington, 1942.)

This paper brings together, for the first time, the descriptive details, analysis, and interpretations of Dr. Cressman's work in eastern Oregon. In addition, there is much previously unpublished material from the Lower Klamath Lake region and northwestern Nevada. In organization, fullness of treatment, copious illustration, and the inclusion of supplementary data from various specialists, this paper represents a milestone in archaeological literature. It will bear the careful attention of all American archaeologists, for it contains a number of problems in method, assumption, attitude, and interpretation which are of fundamental importance.

The report embraces virtually all the sites investigated by Cressman and various associates from about 1933 to 1941. The sites are considered in three groups: (1) caves and shelters in southeastern and south central Oregon, namely, Catlow Cave 1 and Roaring Springs Cave in Catlow Valley, Paisley Five-mile Point Caves 1, 2, and 3 in Summer Lake Valley, and Fort Rock Cave. Plush Cave and De Gorma Creek Cave in Warner Valley also yielded some data; (2) lake bed sites in the swampy Lower Klamath

Lake region along the Oregon-California boundary; (3) shelters and lake bed sites in northwestern Nevada and northeastern California. The last-mentioned group is described by Robert F. Heizer in a separate chapter, and is of particular significance because the sites provide links between the Oregon caves and those near Lovelock, west central Nevada, and between these cave groups and modern Modoc and Paiute cultures. The chapters on the Lower Klamath Lake sites include valuable contributions by Henry P. Hansen on the pollen analysis of peat, Paul S. Conger on the diatoms, and F. C. Baker on the mollusks. Appendices A to H deal with the details of human skeletal material from Catlow Cave, by Hooton and Hrdlička; soil survey; diatoms found in Catlow skull, by Conger; and identification of mammalian, fish, bird, and vegetal species. These supplementary studies indicate the thoroughness with which Cressman has integrated data from special fields into the general archaeological problem.

Parts I to XIV deal with the first group of sites, the caves and shelters within Oregon. A rather full geological study of the northern Great Basin and its marginal areas is included in Part I, while Part II discusses the climates and life zones of the same. In Parts III to XIII the problem of organizing the voluminous material from these sites is answered through a topical approach. Thus the sites are discussed successively in each subject category: physiographic locality, method of excavation, geological stratigraphy, cultural stratigraphy, human skeletal remains, basketry, and so on. Each part includes a section on comparative distribution and relationships of the objects mentioned. As the comparative notes are both archaeological and ethnological, Cressman has brought together a considerable body of data, much of it gained through personal examination of specimens in many institutions. The topical approach may render it difficult for the reader to gain a complete picture of each site and its contents, yet the comparative notes on localities scattered through several states are effectively brought together in this way.

Numerous references are made to a previous paper which presents a general description of the sites and material, the original analysis of the atlatl, bow, and projectile complexes, and the analysis of the unique pumice falls with origin and possible dates.[1]

The numerous photographs of environment, sites, steps in excavation, stratigraphy, and the pumice-fall layers, are well selected and beautifully reproduced. Conger's pollen profiles for the Lower Klamath peat bogs provide interesting evidence of floral sequence. Maps could have been improved. For example, Figure 1, "showing cave localities," does not locate the caves but only the physiographic features in or near which the sites occur. The reader would benefit by an actual site map, and any map should have included the adjacent parts of California and Nevada dealt with in the studies. Figure 2 could just as well have included the important Roaring Springs Cave with Catlow Cave, for they lie not far apart along the same escarpment. Profiles, contours, and block diagrams are many and good. Figures of basketry and sandal techniques are exceedingly well done, greatly aiding the many technical details which Cressman pursued in tracing comparisons with Basketmaker and Plateau technologies. The text description and discussion of these weaves could have been worded more clearly and organized more effectively, yet anyone approaching the subject in the same detail is faced with many difficulties. In another paper[2] Cressman has published several trait distribution maps which would have been valuable in the present work.

A realistic typological organization of the specimens is of fundamental importance in establishing a true *cultural* basis for comparisons. In this respect the present paper contributes a definite step forward, as it is free from the superficialities of "classification

[1] L. S. Cressman, Howel Williams, Alex D. Krieger, *Early Man in Oregon*. University of Oregon Monographs, Studies in Anthropology No. 3, Eugene, 1940.

[2] L. S. Cressman, "Results of Recent Archaeological Research in the Northern Great Basin of South Central Oregon," in *Recent Advances in American Archaeology*, Proceedings of the American Philosophical Society, Vol. 86, pp. 236–246, Feb. 1943.

systems." Type determinations based on distribution and association have been pushed far enough in certain categories to give the analysis real substance. In other categories, in which lack of comparable material in quantity rather prevents sound typological work, the specimens have been described for what they are. However, I was somewhat disappointed to note that type treatment and naming had not been extended beyond its 1939 status. At that time, such types as Catlow Twine and Fort Rock Sandal had been given place-name labels, while others had been only temporarily named for convenience in the laboratory and preliminary manuscript work. Thus, of three definite sandal types, the Fort Rock Sandal had been named, and it would have been but the merest step to settle on similar formalized names for the "spiral weft" and "multiple warp" sandals. Likewise, "Catlow Twine" was established, but the coiled wares were known as 3-rod coiled and single-rod coiled. The projectile points had been reduced to nine strongly contrasting styles, numbered 1 to 9 for reference, but some of these styles included two distinct size groups according to their association with bow and atlatl; this particular problem needs some clarification for typological purposes. The typing and naming of coiled wares and projectiles in the western states is, however, neither an easy nor a local problem; yet we may hope that these and other categories will eventually be tackled. The thorough description and illustration of variation in the basketry type Catlow Twine in the present paper is a good example of what may be accomplished with persistence.

A few errors and omissions occur, some of which should be mentioned. The discussion of atlatls (pp. 69, 139) contains errors and confusing statements about "male" and "female" forms; Basketmaker and in general the ones Cressman calls "female" should be called "mixed," i.e., they have both hook and groove. There is no "incipient female" type from Roaring Springs Cave, but only the male form shown in the frontispiece. Neither are there two forms from this cave, as the reader might infer, but only the one just mentioned, while a second form is represented by the proximal-end fragment from Plush Cave; this latter can be fairly interpreted as closely related to Southwestern "mixed" atlatls, while the Roaring Springs male specimens are very different. The final paragraph on p. 69 and the first one on p. 139 are unintelligible to the reviewer and the reader should consult the previous report.[3] I think that Cressman's reference to "an incipient female" atlatl form represents an attempt to demonstrate that the Roaring Springs specimens were typologically ancestral to Basketmaker atlatls, which he mistakenly refers to as "female." However, as we shall see, his belief that the Oregon caves antedate Basketmaker cultures is open to serious question, and the possibility of morphological ancestry in the atlatls to me would seem purely imaginative.

The discussion of hide moccasins (pp. 75–76) should have included some mention of the large series obtained from the Salt Lake caves by Julian H. Steward (BAE Bulletin 116). The sandal descriptions are at times difficult to follow (pp. 57–61), and Tables 13–14, which give the elevation above sea level of each sandal in Catlow Cave, are a waste of paper.

On p. 61 occurs this statement: "The diversity of sandal types in this area indicates that variety rather than uniformity was the rule. This was certainly true of basketry." Perhaps this view reflects meaning rather than fact, for I have the impression that the exact opposite is true of the Oregon cave weaves. Only three sandal and one resident basketry types connect a whole series of caves in several valleys, illustrating that here (and the same may be seen in the Great Basin generally) technologies tended toward patternization of a very few distinct styles ***within which*** there was variation in execution but withal a strong over-all uniformity. For example, the "multiple warp sandal" varies somewhat in number of sole warps, tie loops, dimensions, and material (Table 15), but there can be no doubt of the essential uniformity in pattern held in mind by those who

[3] Cressman, Williams, Krieger, *op. cit.*, esp. pp. 31–34.

made them. The same sandal, with the same variations, is that which distinguishes the top levels of Lovelock Cave (and, incidentally, it appears in identical form in Ozark shelters). The Fort Rock Sandal and spiral weft sandal, on the other hand, are apparently localized in southeastern Oregon and represent the only real "diversity" in the sandal complex. Again, there is but one resident *type* of basketry (taken in Cressman's own terms) in all the Oregon caves—Catlow Twine. The type includes little variety in start, finish, and warp structure, but considerable variation in decorative techniques such as false embroidery, wrapping, overlay, and diagonal twining. It is clearly, however, one essential type, hence it is unacceptable that "diversity of sandal (and basketry) *types*" characterize the Oregon material. Coiled types enter the scene, but only as late surface additions in the Catlow Valley caves; hence I do not class them as resident. Lovelock Cave has yielded great numbers of specimens, but these include only two sandal, one wicker, two coiled, and perhaps four twined types, and apparently no more than one or two of each of these were made at any one time in the cave's history. The two sandal "types" may, moreover, be no more than finely and coarsely woven variations of one type. Obviously, such arguments revolve about what one means by a type and what variations it includes.

A fragment of *Equus* bone is said (p. 16) to have come from just above the lacustrine gravel in Catlow Cave. Actually, this bone, when first seen, lay in loose rock rubble on or just under the surface against the back wall, from where it was seen by the reviewer to fall and slide down the loose rock and sand of the pit side into the gravel about three feet below; it would appear unacceptable as an aid to dating the gravel into which it had accidentally fallen.

Again, several reports on Catlow Cave have stated confidently that two mineralized bone fragments from this same gravel are artifacts. In the present paper these are called "an awl and a . . . scraper" (Fig. 92, e) and "two 'gouges' " (p. 63). There can be a reasonable doubt that either object is an artifact at all, for upon close examination they appear as possibly nothing more than water-rolled bone splinters. Although this interpretation of the bones is not considered, it appears questionable at least that there was any cultural material whatsoever in the lacustrine gravel which contained human skeletal parts. At any rate, the two bones are of no aid in determining whether the skeletons were interred in the gravel or were washed in by waters of the now-extinct lake. The latter explanation is the one favored by Cressman after considering all the possibilities, although it seems to me that the presence of bone fragments of more than one individual would weaken such an interpretation.

On p. 25 there is a statement that, aside from the lack of basketry in the Roaring Springs Cave lower stratum, "there was no clear break otherwise in the culture represented in the cave. A change did occur but it was gradual." This could conceivably apply to the projectile sequences, especially the change from atlatl alone to atlatl and bow together, but regarding the rest of the material it would be very difficult to find a better example of a clean break, stratigraphically and culturally, in a cave deposit. The various styles of arrow points, coiled and twined basketry, sandals, netting, awls, and wooden artifacts in the upper bed place it in a totally different scheme from the lower bed, as Steward has already noted.[4]

The constantly repeated statement that Catlow Twine basketry was found in the Lovelock Cave "Early period" is another point which cannot be taken literally as will be seen below.

In the literature cited there are at least two noteworthy omissions. The most serious is the work of J. C. Jones on the geologic age of Lake Lahontan.[5] As some of the Oregon

[4] In *Essays in Historical Anthropology of North America*. Smithsonian Miscellaneous Collections, vol. 100, 1940. See fig. 30 and pp. 461–462.

[5] In *Quaternary Climates*. Carnegie Institution of Washington Publication 352, 1925.

valleys are part of the Lahontan basin, and others are so closely connected with it physiographically that they were probably subject to the same climatic fluctuations as Lahontan, the dating of the lacustrine gravels in Oregon caves must take into consideration the various estimates on the age of Lake Lahontan. Cressman cites only Antevs' opinion that the lake existed during the Little Pluvial. While Antevs' work generally carries great weight among archaeologists, Jones was, nevertheless, the only geologist who attempted to date Lahontan by objective methods. It is of no small significance that his studies led him to conclude that the great lake reached its maximum height at about 1000 A.D., but whether he was right or wrong, his estimate cannot be ignored by archaeologists working in the Great Basin. The second omission is the important ethnographic work of Omer C. Stewart in tracing tribal distributions and the occurrence of several thousand culture elements in the northern Great Basin.[6] Much of his data bears directly on the interpretation of the cave materials in both the positive and negative senses.

Other such points could be mentioned, but it is necessary to turn to the problems of dating the cave deposits. I omit the Lower Klamath Lake and Paisley Cave 3 sites, with their interesting faunal associations, and the human skeletons in the Catlow Cave gravel, for Cressman has treated these adequately. Whatever their dates, they are unquestionably older than the voluminous "vegetal" deposits, that is, those bearing basketry, mats, sandals, wood and reed artifacts, etc. with the usual bulky debris found in dry caves. It is the methods of interpreting the age of these later remains which must be questioned.

We may first consider the pumice falls. Williams[7] has determined that (1) the pumice layer in Paisley Caves 1, 2, and 3 originated in the volcanism which destroyed Mount Mazama and led to the formation of Crater Lake in the remains of the mountain; (2) the pumice layer in Fort Rock Cave originated in Newberry Crater (or in one of its satellite craters) to the north of this cave, and that it fell while still hot, firing the deposit. Probably (but not certainly) the Newberry action was later than the Mazama. In Fort Rock Cave most of the artifacts, including the masses of charred sandals, were below the pumice, while in Paisley Caves 1 and 2 the few objects recovered appear similar both above and below the pumice. As the Fort Rock Sandal type occurred in the basketry bed of Catlow Cave, and one specimen of the multiple warp sandal, common in Catlow and Roaring Springs Caves, occurred below the pumice in Paisley Cave 1, a certain amount of cross-dating is possible. The date of Mount Mazama's collapse, if it can be determined, should provide a clue to the dating of all the caves under consideration.

Williams[8] has approached the problem from eight different points of view. He concludes that "tentatively, the evidence points to an age of approximately 5,000 years, and to a maximum of 7,000 and a minimum of 4,000 years. Yet we may anticipate with confidence that continuing studies . . . will provide a more accurate solution of this fascinating problem." (p. 114). Yet on p. 3 he had written that "the formation of Crater Lake took place approximately 5,000 years ago. . . . After a period of quiet of unknown duration activity commenced anew. Close to the western edge of the caldera rose the cone of Wizard Island, the final act of which was to erupt a rugged sheet of blocky lava, perhaps no more than a thousand years ago . . . ," and on p. 116, " . . . The period of quiet following the collapse of Mount Mazama was probably short." In other words, the ejection of pumice was connected with the collapse of the crater, while the final, Wizard Island, action produced a lava flow, but the time between these actions is unknown. In one place, this is implied as 4,000 years, in another a "short" time. If the final volcanism

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[6] Anthropological Records, Vol. 2, pp. 127–149, 1939, and Vol. 4, pp. 361–446, 1941. (University of California Press); *American Anthropologist*, Vol. 40, pp. 405–407, 1938.

[7] Cressman, Williams, Krieger, *op. cit.*

[8] Howel Williams, *The Geology of Crater Lake National Forest, Oregon*. Carnegie Institution of Washington Publication 540, 1942.

occurred 1,000 years ago, there appears to be little certainty that the great pumice ejection and collapse occurred 4,000 years before that.

Williams' first seven approaches to the dating problem cannot be quoted here, but the eighth is of particular significance.

> A *minimum age* for Crater Lake is given by the trees on Wizard Island. The oldest of them is said to be approximately 800 years of age, and if, as seems probable, the last eruptions from Wizard Island killed all pre-existing vegetation, then the final activity took place *a little more than 800 years ago*. Unfortunately we cannot tell how long it took for the Wizard Island cone to grow to its present height, nor can we say how long an interval of quiet followed the formation of the caldera before volcanism was renewed. (p. 114; italics mine)[9]

After weighing the various factors, Williams tentatively considers 5,000 years ago the most likely time of the Mazama eruption, but this is given reservedly, pending more extended study of such matters as rates of erosion in the area. In conclusion, he advances a "minimum" date of 4,000 years, in spite of having introduced a paragraph in which 800 years is clearly given as a minimum. Perhaps he merely considers the latter figure unlikely, but, as we shall see, it is of the utmost importance that the archaeologist consider this matter fairly in the light of all possibilities. Now Cressman, for archaeological purposes, has taken Williams' "probable" date of 5,000 years as a proved fact, repeatedly quoted it as the determined minimum in the face of Williams' own statements, and built much of his reconstruction of Oregon prehistory upon it. It forms one of the main bases for his contention that the Oregon cave remains are older than Basketmaker, and that the occupation of these caves *came to an end* "about the beginning of the Christian era." Between the 4,000 and 5,000 year figures there is perhaps no crucial difference, but between these and a time 800 years ago lies the whole conceptualism of the Oregon material in relation to other archaeological horizons in America. I refer particularly to the fact that these caves have yielded large numbers of arrow points, and that the general position of these caves within a bow horizon is of greater significance in determining their chronological position than the selective geological estimates which Cressman has presented. It is also significant that the comparative work in material culture is, like the geological estimates, selective. Thus, while the comparisons with Basketmaker traits emphasize basketry, and the Oregon material is held to antedate Basketmaker horizons, the crucial arrow point matter, which of course tends to negate this argument, is not considered.

In his Summary and Conclusions, Cressman recapitulates the arguments for temporal orientation through trait comparisons. Three classes of material receive most attention: twined basketries and bags, coiled basketries, and L-shaped awls. Sandals are dismissed with the remarks that one Oregon "variety" (the multiple warp type) appears in Lovelock Cave and "Our sandals permit no conclusions on affiliation" (p. 138). Yet, on p. 60, he says that "sandals were found only in the upper levels in Lovelock Cave (Loud and Harrington, p. 27). This situation is difficult to explain in view of the correlation of other traits from the earlier levels of this site and the Oregon caves, except on the grounds of chance based on the method of excavation." This is to say that a late Lovelock trait failing to "correlate" with the Oregon caves must owe its position to some accident in recovery. We may well ask if there really is such a correlation, as Cressman continually insists. This premise can be examined briefly, but first let us note again that there is no mention of arrow points in the summary. Certainly Cressman is aware of the fact that the lower three of the six Lovelock levels, as well as Basketmaker sites, lack the bow and arrow, hence this omission is perhaps not accidental. Looking at American archaeology broadly, I think there is little doubt any longer that true arrow points represent

[9] Following the formation of the great crater of Vesuvius in 1906, a new cone thrust up from the crater floor in 1913. During the seven-year interval the mountain was almost completely quiet. Frank A. Perret, *The Vesuvius Eruption of 1906, Study of a Volcanic Cycle*. Carnegie Institution Publication 339, 1924.

the latest horizons in almost every region, in some cases barely preceding historic times.

The numerous notes on twining techniques and distributions are much to the point and constitute one of the best features of the paper. The outstanding result of this survey is the striking similarity in soft twined bags of the Basketmaker and those found in the Plateau area among the historic Klamath, Wishram, Nez Percé, etc. There is also a strong similarity between these bags and the flexible Catlow Twine basketry in the use of two-ply twisted warps and warp bundles passing through the basket base. However, the use of overlay, false embroidery, and wrapping for decorative effect places Catlow Twine in a generally northern distribution extending from central California to the Tlingit (and Aleut). It seems clear, too, that the closest affiliation of Catlow basketry is with the modern Klamath-Modoc ware, the differences being so minute that they could represent no more than local variation within the same horizon. As Cressman says, "The tantalizing problems raised by these resemblances are subjects for further investigation, but the information to provide the answers is not now at hand." Nevertheless, this statement is given:

> (The twining) complex did not develop among the Basket Makers, at least not in the Four Corners. It is a highly developed art in the earliest horizons and consequently, as in the Oregon caves, its source must be sought somewhere outside the area. This source must certainly be toward the north, since twining is predominantly northern in distribution and evidently in origin. . . . Although the Basket Maker bags differ in materials and in some details from the semiflexible Catlow Twine of the Northern Basin and Plateau, yet there is a remarkable gross likeness, so close that it cannot be ignored. Apparently there is some developmental relationship, *with the early Oregon technique antecedent to the Basket Maker if our stratigraphic material means anything*, or else the techniques of both areas go back to a common source, so far undetermined. (p. 138; italics mine)

The stratigraphic evidence referred to is evidently the often repeated statement (pp. 42, 44, 134, 137, 138, 139) that Catlow Twine is found in, or "belongs to," the early Lovelock levels. Even if this were true, no one else has yet claimed that the lower Lovelock levels were antecedent to Basketmaker times. What I especially want to point out is that the few fragments of Catlow Twine found in Lovelock and Humboldt Caves are definitely connected with the *top and surface lots* in the former cave and with the upper half of the latter. The evidence for this was given to Dr. Cressman in 1938, for at that time, while working over Humboldt Cave material in Berkeley, I checked the position of all pieces of Catlow Twine in both Lovelock and Humboldt Caves, and brought these, with the catalog data, back to Eugene for Cressman's own use. The specimens in Berkeley did not include Harrington's 1924 collection, for this was in the Heye Foundation. If Cressman later examined the Heye specimens and found that the type also came from the lower levels, this does not affect the fact that some Catlow Twine fragments came from the upper parts of the Nevada caves. In Berkeley, there are some specimens of twining from lower Lovelock levels but these belong to a stiff, stick-warp style which is neither Catlow Twine nor "similar to Klamath-Modoc" as Loud and Harrington state. Therefore this aspect of the "correlation" appears to me quite invalid.[10]

The coiled basketry in southeastern Oregon is represented by a few fragments on or near the surfaces of Catlow and Roaring Springs Caves, but not from the others. Both three-rod-triangular and single-rod foundations are included. However, the three-rod form was found in all six Lovelock levels, while the single-rod came from the upper three. The historical meaning of this basketry in Oregon is not, however, a simple matter of matching with Lovelock Cave, as Cressman makes it, for it must be noted that potsherds also occurred on or just under the surface in Catlow Cave, in the same approximate position as the coiling. The pottery would seem to be a very late trait at Catlow, and, as

[10] The six arbitrary levels carried in one section of Lovelock Cave by Harrington in 1924 represent only a fraction of the deposit and are not wholly reliable for checking trait presences. They do give a rough idea of what was found in upper, middle, and lower levels, but the numerous cave "lots" of Loud in 1912 can be used to supplement the "stratigraphic" record.

its origin appears to be the Plains, or at least not the Southwest or the Shoshoni (p. 91), it would seem likely that it could have been carried in from the east in late prehistoric or historic times. Shoshoni, in the position of traders, could have been responsible for the occurrence of both pottery and coiled basketry in this cave.

The general absence of coiling in the Oregon area is peculiar, but no more so than the general absence of wicker and stiff twining (one of each on Roaring Springs Cave surface), sheep-horn sickles, and curved clubs. Moreover, we have a note that coiling may have been totally unknown to such peoples as the Surprise Valley Paiute until a time within the memory of living persons.[11] It may be that the cave dwellers simply did not make coiled basketry, their twine sufficing for all needs.

Regarding L-shaped awls, these are found on Basketmaker sites (according to Cressman) and in some Lovelock levels. Cressman has also discovered scattered Plateau and Utah occurrences. The three Roaring Springs specimens are of somewhat indefinite provenience (p. 64), hence it would not appear reliable to place as much "diagnostic" and historical stress on these implements as Cressman does. The connection with Basketmaker is questionable.

In summary, the "correlation" between the main Oregon deposits and "early Lovelock" levels adds up to something like this: Catlow Twine in upper and surface lots at Lovelock, possibly also deeper; combined three-rod and single-rod basketries in the upper three Lovelock levels; L-shaped awls in the sixth (bottom) and the third Lovelock levels but indefinite in Oregon; sandals in all Oregon caves and in the top one or two levels of Lovelock; arrow points throughout the Oregon basketry levels and in the top three Lovelock. In all of this a definite connection with Lovelock, temporally, is most difficult to ascertain; connections with Basketmaker seem even more so. Again, what is the age of Lovelock Cave? Granting the presence of a few Basketmaker traits there, the cave as a whole is distinctly not a Basketmaker site and may be considerably more recent in its occupation than Basketmaker. Obviously much additional patient work must be done before the answers become clear.

On the whole, I feel that Steward's review[12] comes very close to the true interpretation. He places the Oregon basketry culture in a general horizon between 1000 A.D. and the historic period, the pre-basketry somewhere between 0 and 500 A.D., although there may not be any such time gap between the two cultures. The first date is in keeping with the relative position indicated by the arrow points and sandals, and by the very close resemblance between Catlow Twine and modern Klamath-Modoc basketry. Cressman's postulation of a 2,000 year interval between the cave basketry and the modern ware in an immediately adjacent territory seems untenable. Excellent preservation of textile objects, even in damp corners of Catlow Cave, is another item for consideration.

The arguments set forth in this paper could be defended on the basis of "geological evidence." It is, of course, good and necessary procedure to obtain geological advice on archaeological problems, but at the same time geologists are usually quite helpless to give more than a probable time *span* within which the human activities took place. Most geologists readily admit this. Within these estimates it is up to the archaeologist to reason out his problems with greater precision. The pumice eruptions remain a most interesting aspect of Oregon prehistory, yet there is much to indicate, on a comparative basis, that the cave basketry levels belong to the recent horizon shown by Steward. If a "minimum" or even a "probable" date of 5,000 years is accepted for the Mazama pumice ejection, then an arrow point horizon from three to ten times as long as anywhere else in North America is indicated. On the other hand, the possibility that both the Mazama action

[11] Isabel Kelly, *Ethnography of the Surprise Valley Paiute*. University of California Publications in American Archaeology and Ethnology, Vol. 31, pp. 67-210, 1932; see pp. 120, 122.

[12] Steward, *op. cit.*

and the existence of "Pleistocene" lakes in the Great Basin could, according to certain other geological estimates, have occurred since 1000 A.D. is not so much as considered in the present paper, despite the fact that such a horizon is strongly indicated by the comparative material culture.

The paper also includes considerable emphasis on changing environment in southeastern Oregon (p. 136). According to Cressman, the desiccation of the great lakes forced man to adapt himself to dry conditions; that is, to a life in the desert with only occasional springs for water supply, rather than extensive lake shores. Although much is made of this point, I see not the slightest *archaeological* evidence for it. All the cave deposits postdate the existence of the lakes at their highest levels, although it may be presumed that lower levels may have been reached from time to time. But whether or not it can be shown that the cave culture existed during minor rises of the lakes, there is no reason to suppose that the cave culture was any "richer" at any time in the past. The contention that modern Klamath-Modoc culture is a degenerate survival of a rich and populous lacustrine civilization to the east in far-gone times appears to the reviewer the least supportable idea yet to result from the Oregon work. What indicates a "richer" culture? More mat and basketry fragments in one cave than another? Different numbers of specimens from arbitrary excavation levels?

The whole interpretation seems much too rigid. The mere fact of upper or lower position in sites in some cases several hundred miles apart does not take into consideration the time necessary for diffusion or the possibility of circuitous means of diffusion. One may wish for less talk of "Early Man."

But I have concentrated perhaps too much on the interpretation. There is a great wealth of valuable material in the paper, and in illustration and organization it is superb.

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Recent Advances in American Archaeology. Papers read before the American Philosophical Society Annual Meeting April 23, 24, 25, 1942. (Proceedings of the American Philosophical Society, Vol. 86, No. 2, pp. 205–327. Philadelphia, 1943.)

The papers included in this publication were all read at a symposium held on the first day of the annual meetings of the American Philosophical Society in Philadelphia on April 23, 24, and 25, 1942. The leading article is by Sylvanus Griswold Morley, who gave the Franklin Medal Lecture on this occasion. In 15 pages, and with many illustrations, he discusses the work of the Carnegie Institution of Washington in the Maya area during the past twenty-eight years. The majority of the remaining articles deal with various phases of archaeological research in North America. The last two articles, however, report on work in Mexico and South America. They are "The Aztecs: Their Cultural and Historical Position in Middle American Archaeology," by George C. Vaillant, and "The Position of Chavin in Andean Sequences," by Wendell C. Bennett.

Five articles relate in one way or another to the study of the antiquity of man in North America. One of these, by Henry B. Collins, Jr., deals with "Eskimo Archaeology and Its Bearing on the Problem of Man's Antiquity in America." Another, by L. S. Cressman, reports upon the "Results of Recent Archaeological Research in the Northern Great Basin Region of South Central Oregon." A third describes the "Discoveries in Sandia Cave and Early Horizons in the Southwest," and is written by Frank C. Hibben. Edgar B. Howard outlines "Folsom and Yuma Problems," and Emil W. Haury discusses "A Possible Cochise-Mogollon-Hohokam Sequence." Of these, the articles by Collins, Cressman, Hibben, and Haury indicate possible continuities between very early records and more recent ones.

Harold S. Colton furnishes a thoughtful "Reconstruction of Anasazi History." The "Chronology in the Middle West," which is gradually being revealed, is outlined by Fay-Cooper Cole. Problems in southeastern United States archaeology are discussed by T. M. N. Lewis under the title "Late Horizons in the Southeast." Two articles deal with the northeastern area. One of these is by William A. Ritchie on "Recent Advances in New York State and the Northeast," and the other, by Dorothy Cross, gives the latest interpretation of the records of the Abbott Farm, under the title "The Effect of the Abbott Farm on Eastern Chronology."

One article, which, by the way, does not carry the caption that it was read on April 23, 1942, differs from the others in describing in detail a single, unusual archaeological find in the Southwest. John S. McGregor, writing under the title "Burial of an Early American Magician," furnishes a detailed and interpretative account of an unusual burial containing an impressive quantity of archaeological material, some of which is illustrated in the three colored plates.

These fourteen articles are contributed by research leaders, each of whom deals with an aspect of the field with which he has had direct contact either as a field worker or as a director of research. It is understood that the authors chosen reflect in large degree the extent of the interest and support of the American Philosophical Soicety in American archaeology. The subjects dealt with and the details given in the several articles are of such a variety that it would be presumptuous for any reviewer to attempt to make critical comments upon the papers individually. Each of the authors records his interpretation of the data he has incorporated in his paper. The very fact that in many instances problems are discussed which are still controversial makes this publication particularly valuable as a record of the recent advances in and the present status of American archaeology. Because of the rapid developments in American archaeology during the last few years, publication has not always kept up with the results obtained in field and laboratory work. It is particularly fortunate that during this time of national stress it has been possible to record in permanent form a review of archaeological research in the New World as of the spring of 1942.

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Man's Poor Relations. EARNEST HOOTON. (412 pp., 74 plates, 11 line drawings, bibliography. Doubleday, Doran and Co., New York, 1942.)

Man's Poor Relations is the fourth book written by Professor Earnest Hooton since 1931. Each one has been a treatment of the subject of the "structural" and "functional" (including behavior) relationships among the non-human primates, monkeys and apes, and the similarities and differences between these and man. *Up From the Ape* (1931) seemingly was written for the curious, advanced college sophomore or junior. *Apes, Men and Morons* (1937) apparently was directed toward the semi-scientific general audience. *Why We Behave Like Apes and Vice Versa* (1940) consisted of re-written lectures prepared originally for a general university audience. These books have been characterized by a semi-popular style, spiced with humor which gained its impulsion from unfavorable comparisons of man with the monkeys and apes.

Man's Poor Relations continues the series and is a serious and scholarly summary of the available information which characterizes the anatomical, physiological and behavioral characteristics of all known general types of primates, man included.

Professor Hooton reviews systematically and comprehensively the extensive and growing literature in the field now known as "primatology." The material is organized,

with much logic, around the scaffolding of taxonomic relationships which is generally accepted by authorities. Each type of monkey or ape selected for consideration is first described by a catchy phrase, e.g., "Ape Aristocrats," "Chimpanzee—The Extrovert Ape," etc.; then, with unusual accuracy for summaries of literature, Hooton describes where the type is found, its general anatomical characteristics, its behavior in its native habitat, its main functional, behavioral and social characteristics and, finally, its detailed physical anthropological features. This schema is used, within the limits of available literature, for the whole range of primates, beginning with the chimpanzee and concluding with the lemur. After laying a solid comparative review background for the non-human primate types, man is brought into the picture. Hooton's theme is brought to a conclusion by a chapter on "Evolutionary Perspective."

Professor Hooton's apologies for writing *Man's Poor Relations* are not acceptable; his long standing and active interest in the field of primatology, his mastery of language both general and special, his fluid and interesting style and his somewhat detached and objective perspective, all have contributed to the outstanding qualities of his latest book. The author is not responsible for the lack of entirely adequate information about many phases of the natural history of the primates. Professor Hooton has used the observations and experimental results about the primates to answer the perennial question: What is the *meaning* of the large body of available facts about man's non-human relations. A more complete answer has been given by Hooton to this question than has been supplied by any other authority who has tried previously to interpret the findings of the general field of primatology.

The book should be of interest to many archaeologists, because sections of it deal specifically with "Extinct Ancestors and Collaterals," and because of the possibility that some species of primates may roughly represent various stages of human "structural" and behavioral evolution.

C. R. CARPENTER
Pennsylvania State College

The SU Site, Excavations at a Mogollon Village, Western New Mexico, Second Season, 1941. PAUL S. MARTIN. With chapters by ROBERT J. BRAIDWOOD, JOHN RINALDO, MARJORIE KELLY, BRIGHAM A. ARNOLD. (Field Museum of Natural History, Anthropological Series, Vol. 32, No. 2, Chicago, February 24, 1943.)

With this bulletin, in his usual clear and concise fashion, Dr. Martin brings up to date both the record of the exceptionally important work at what is undoubtedly one of the oldest pottery-yielding sites excavated in the Southwest, and also his own record as probably the only archaeologist of the Southwest whose work is fully published.

The data and material recovered in 1941 largely supplement those of the previous season, without introducing many new and different facts. The factual material from both seasons is synthesized and interpreted in this volume, the previous report[1] having been carefully confined to data with little interpretation or discussion. This would seem to be an excellent procedure in cases where a second season is reasonably assured.

Techniques of excavation are described in detail by Robert J. Braidwood of the Oriental Institute. Architectural features are concisely presented in what may be called the Haury-Martin style, with tabulated descriptions opposite illustrations.

Stone and bone artifacts are discussed and similarly presented by John Rinaldo. The stonework is closely similar to that of the pre-ceramic Cochise complex of southeast-

[1] Paul S. Martin, *The SU Site, Excavations at a Mogollon Village, 1939.* Field Museum Anthropological Series, Vol. 32, No. 1, 1940.

ern Arizona, a highly significant fact supplementing the discovery in that area that pottery-making culture of Mogollon affiliation developed out of Cochise without change in the stone industry.[3]

The section on pottery, on which Jane Darrow collaborated with Dr. Martin, is more satisfactorily detailed than some of Martin's previous discussions of pottery. The material referred to in the report on the first season's work as "Polished Red" is here named "San Francisco Red, Saliz variety." Calling it a variety or subtype is commendable restraint, as the distinctions between it and typical (later) San Francisco Red could be taken to justify separation and full type status. "Alma Rough" is a good name for the "Unpolished Brown." Whether the pottery is tempered with tuff-derived sand is not immediately apparent from the non-duplicating statements of Florence Connolly of the University of Arizona and Dr. S. K. Roy. The sand as described by Miss Connolly for most of the material could perhaps have been largely derived from tuff; Dr. Roy says it is all volcanic ash but makes no statement as to angularity.

As in the previous SU report, Marjorie Kelly's section on the skeletal material is disappointingly brief and scanty, stating merely that the skulls are brachycranial, the mean index of *two* being 84.5 (why not give them separately?), and hypsicranial, and that "some exhibit cradleboard deformation." How much deformation, and what kind? Are any of the skulls clearly undeformed? Are the two whose cranial indices average 84.5 definitely deformed? Burial data are given in the report on skeletal material.

Sherd areas representing, undoubtedly, pithouse villages of the early Mogollon periods, small stone pueblos of the Three Circle (early Mimbres) phase or focus, and perplexing and highly interesting stone ruins lacking pottery, are described in the section on intensive archaeological survey of the immediate vicinity, which was written by Brigham Arnold of the University of Arizona.

The material from the SU site, or the cultural manifestation which it represents, is named the Pine Lawn phase (focus) of the Mogollon branch of the Playas stem of the Mogollon root. A root name should not be used also for a branch. The name "Mogollon" has gradually come to be used for the root and to refer to material of a general type from the Pecos to the Verde, and can no longer be used for the Mimbres or any other one branch.

Martin defines the Mogollon "culture" in terms of the earliest known phases only, and even in terms of the Cochise culture: "Pottery—not present in incipient Mogollon stages" and "Economy, principally food-gathering." No one defines Hohokam only by the Pioneer stage, or Anasazi only by Basketmaker. Martin, and other "pro-Mogollonists," are interested primarily in the antiquity and basic quality of Mogollon. Consequently, they overemphasize the alleged Anasazi influence in the later Mogollon phases and claim that after 1000 A.D., or even after 700 A.D. (as Martin and Rinaldo), Mogollon is no longer "pure" and therefore no longer Mogollon. By implication this admits the former theory of the San Juan school that all major features of Anasazi culture were autochthonous. There is no more difference between early Mogollon and classic Mimbres, or between Forestdale and Pinedale, than between Basketmaker III and Pueblo III in the San Juan. I should like to see a list of the specific traits known (not merely assumed) to be of Anasazi origin which constitute the surge of overwhelming Anasazi influence which supposedly poured into the Mimbres-White Mountains area to dominate and submerge the Mogollon culture. Also I should like to see a list of the cultures which remained pure after 1000 A.D.

The socio-psychological analysis of the bearers of Mogollon culture as mild, timid,

[3] Haury, E. W., "A Possible Cochise-Mogollon-Hohokam Sequence." *Proceedings of the American Philosophical Society*, Vol. 86, No. 2, pp. 260–263, Philadelphia, 1943.

retiring, non-expansive, highly conservative folk does not seem justifiable; and certainly would not support the view that they were the Kulturträger of the Southwest.

Martin dates the Pine Lawn phase or focus as before 500 A.D., which is not unlikely and not extreme, although a more conservative and logically defensible phrasing would be preferable—"probably circa 500, perhaps earlier" rather than that, because it evidently precedes two phases dated inferentially, it "must antedate 500 A.D." There is good evidence for approximate correlation of the San Francisco phase (focus) with Pueblo I of the Anasazi, circa 750–950 A.D.; correlation of the underlying Georgetown phase with Basketmaker III (450–750) is an inference wholly reasonable, but far from proven. Correlation with Basketmaker III does not mean with all of Basketmaker III, nor does correlation with Pueblo I mean with all of that period. The Georgetown phase could, so far as known, have been contemporaneous with early Pueblo I, or with the last century or so of Basketmaker III. I do not disagree with Martin's conclusion, as a working concept, but I object to parts of his logic in reaching it. Recent findings at Forestdale include a site roughly comparable to the SU site which has been dated at circa 320 A.D.[2]

ERIK K. REED
Santa Fe, New Mexico

Compendium and Description of the West Indies. ANTONIO VÁZQUEZ DE ESPINOSA, translated by CHARLES UPSON CLARK. (Smithsonian Miscellaneous Collections, Vol. 102.)

The *Compendium and Description of the West Indies* is a valuable addition to the anthropo-geographical background of Latin America. The author covers a very wide field and includes extracts from important manuscript reports. An excellent index reinforces the content of the volume.

GEORGE C. VAILLANT
University Museum, Philadelphia

Origin Legend of the Navaho Flintway. FATHER BERARD HAILE. (The University of Chicago Publications in Anthropology, Linguistic Series. 319 pp., 8 illustrations. Chicago: University of Chicago Press, 1943. $3.00.)

Once again, from his vast store of knowledge and material, Father Berard has made an indispensable volume available to the student of Navaho culture. With his *Origin Legend of the Navaho Enemy Way*[1] it becomes, indeed, almost of necessity a constant companion. These two monographs, selected for publication from what those of us who have been privileged to know Father Berard have found to be the largest accumulation of recorded Navaho texts in existence, are the richest source of combined linguistic and ethnological data to appear since the publication of the classic works of Washington Matthews, around the turn of the century. In fact, "Flintway" fulfills an ideal expressed to me by a prominent singer of this chantway, when he said that he wished the chant could be written down in such form that anyone could successfully use the record in case of future failure of oral transmission. The text contains a complete record of the songs and prayers of Flintway, the first to be published for any Navaho ceremonial, so that with a knowledge of the pertinent music and action patterns any speaker of the language could perform the ceremonial.

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[2] A. E. Douglass, "Checking the Date of Bluff Ruin, Forestdale," and E. W. Haury, "Some Implications of the Bluff Ruin Dates," *Tree-Ring Bulletin*, Vol. 9, No. 2. Tucson, October, 1942.

[1] Yale University Publications in Anthropology, No. 17, 1938.

Not only is this volume invaluable for the ethnologist but there is also much in it for the archaeologist, especially since the comparatively new field of Navaho archaeology is beginning to get a foothold. Association of Navaho legendary material with archaeological sites in the Navaho country is no new thing. A considerable body of lore surrounds the ruins in the Chaco Canyon and in the Canyon de Chelly, to mention only two instances. But associations with sites outside of the present Navaho country, other than vague waves of the hand toward "somewhere in the north," have hitherto been lacking. Father Berard and his informants have quite definitely identified the always mysterious Sun Temple of the Mesa Verde with the "home of flint" (and possibly with the "flint corral" as well) of the legend (note 58, p. 25). The correspondence between the architecture of the ruin and certain details of the text is most striking. My informants likewise placed "Whirling Earth" (note 141, p. 53), "where Flintway medicines and songs started," in the Mesa Verde country, saying that it is "like a kiva" and near the "home of flint," "where the cranebills were first made"; and one of Dr. Kluckhohn's informants said that Whirling Earth is north of the Jicarilla country, that he had never seen it but had talked with Jicarillas who had seen it. The so-called "sun dial" at the southwest corner of the Sun Temple was regarded by Father Berard's informants as an actual sun dial employed for setting the dates of certain special ceremonies or for telling the legends of Flintway. My informant confirmed this and declared it to be a turtle shell medicine cup (note 80, p. 32) with the cranebills (note 42, p. 22) crossed over it, "all turned to rock." Although white archaeologists may not have solved the riddle of the Sun Temple, it is comforting that the Navaho are specific about it; and their beliefs may prove to be more significant than is now superficially apparent, especially in the face of the opinion held by some ethnologists that the Navaho had arrived in the southwest at the time when these structures were inhabited. Much of the legend of Flintway, especially the first half, has its locale in the Mesa Verde region (notes 29, 141). Other references to archaeological sites occur (see note 9, p. 15, Awatobi; note 2, p. 289, and note 4, p. 304), and many references to geographical locations where future archaeological work may reveal some connection with Navaho mythology. A volume such as this is likewise of great value for the interpretation of material found in Navaho archaeological digs. Notes 7, 57, 72, 77 and 104 (concerned with flints), and of course innumerable passages throughout the text, are pertinent in this respect. Archaeologists should watch for "manshaped flints" (note 77, p. 31), for to my knowledge they do not now occur among the various stone implements employed by Navaho practitioners.

The legend itself concerns the adventures of a young hunter who, having had adulterous relations with the wife of White Thunder, was shattered by the latter. Gila Monster Man was employed to restore him; and the detailed description of the process, together with that of three subsequent ceremonials held to complete his cure and that of the preparation of the original pouches and medicines, forms the prototype of the Flintway ceremonial complex now used to treat internal injuries and their effects. A goodly part of the legend involves the hero's journey with the Buffalo, and their destruction and re toration by him, whereby the Buffalo songs, prayer, medicines and rattle, all important in Flintway, were obtained. Two versions ("A" and "B") from different singers had been secured. Version A forms the basis of the published text, but several chapters from version B are included to illustrate the variation found in the oral literature of the Navaho. Part 66 of the text (pp. 272–284) is a condensed account by the native author of version B of the use, the genesis, and all the details of a Flintway ceremonial. It is an excellent summary.

The text and translation are preceded by an extensive introduction and numerous ethnological notes (pp. 1–55) and followed by notes to the text and to the translation (pp. 289–319). In these sections may be found, not only data specifically pertaining to

Flintway, but enough material to give the reader a fair idea of Navaho ceremonialism as a whole. A number of the notes will be obscure to readers who have not specialized in Navaho culture, and a few perhaps even to specialists in Flintway (e.g., 5, 40, 48, 105). There are a few statements with which Dr. Clyde Kluckhohn and I cannot at present agree, particularly in the light of our experience with objective behavior in this chantway. We are still convinced that, with respect to ritual, Navaho chantways and rites present at least a trichotomy (we are ready to admit that Blessingway may not stand apart with a special ritual): *holyway*, *ghostway* (*evilway*), and *lifeway*, instead of a dichotomy as Father Berard believes (note 107, p. 41). *Lifeway* ritual seems to us to bear the same relation to Flintway and to the chantways which have borrowed from it, that *ghostway* ritual bears to Upward-reaching-way ("Moving-up-way") and to its borrowers. The statement that cranebills are a part of the equipment of Shootingway and may be borrowed for use in Shootingway branches of Lifeway ceremonials (notes 8, 43, 68, 114) is at variance with our observations and with the statement of my informant that "Flintway can borrow pouch from Lifeway, Female Shooting Branch, but cannot use arrows; and Lifeway, Female Shooting Branch, cannot use crane's heads." The botanical identification of plant medicines is not always accurate, the identifications of the Franciscan Fathers having apparently been used (notes 79, 106). For instance, "thoroughwort" (p. 41) is known to the Navahos as "wind odor," while the native name applied to it by Father Berard is that for *Lithospermum*.[1] Finally, we cannot agree that "references to Navaho ceremonialism and relevant topics are comparatively meagre" (p. 55); hence the bibliography seems somewhat incomplete. These criticisms, which are certainly picayune in the face of the magnificence of the work as a whole, may stem partly from the fact that the manuscript was apparently last revised by the author in 1938.

It is unfortunate that the method of printing did not allow proofreading, for the innumerable typographical errors made in typing the manuscript for reproduction interfere in many places with ease of reading and sometimes actually reverse the meaning. Errors in the translation are bad enough, but errors in the Navaho text cannot but hopelessly confuse the student of linguistics who is not already quite familiar with the language.

Finally, it may be remarked that the correspondence between the material presented in this monograph and the details of Flintway as I have found them, both in objective behavior and in information from Navahos living in regions other than those inhabited by Father Berard's informants, is truly remarkable. Inasmuch as my principal informant was a former apprentice of the native author of Father Berard's "version A," this correspondence is evidence for the comparative stability of orally transmitted ceremonial patterns.

LELAND C. WYMAN
Boston University

Indian Villages of the Illinois Country. Compiled by SARA JONES TUCKER. (Scientific Papers of the Illinois State Museum, Vol. 2, Pt. 1, Atlas. Springfield, Illinois, 1942.)

This atlas is of unusual interest to all archaeologists, even though its contents are restricted to a section of North America. The compiler, the Department of Anthropology of the University of Chicago, and the Illinois State Museum are to be congratulated upon the publication of the maps. The maps are an indispensable source of information concerning the early distribution of different tribes in various regions and the result of the

[1] See L. C. Wyman and S. K. Harris, *Navajo Indian Medical Ethnobotany*, University of New Mexico Bulletin, No. 366, 1941, p. 67.

competition between European and Indian for the land. The increase in land values with the change in population and the various modifications of the character of the competition is amply shown.

From the archaeological point of view, this is of greater importance than is commonly realized. We have here a record beginning with an aboriginal occupation which is only slightly modified by European intervention. At the present moment, this record is not complete. Obviously the collection of maps is a selection, and we await the promised second volume, which we hope will explain the reasons for discarding the maps which are missing. We also assume that details pointing out specific facts of importance to archaeologists and other anthropologists will be forthcoming. Various ideas obtainable from this record, particularly when the maps are combined with the documents which will accompany them, will be of utmost value to the fuller interpretation of prehistoric conditions as revealed through excavations. It may be added that these maps also aid in filling a gap and in correcting previous misconceptions in the history of the Indians which have been allowed to exist for too long. Such data are vital to ethnographers, students of acculturation, economic historians, and the like, as well as to archaeologists.

In addition to the maps themselves there is a preface, an extensive bibliography and a section of notes on the maps. In the latter, there are annotations referring to each map. These are not complete, at least from the point of view of a bibliophile, but they are adequate for uses which do not require a display of pedantry. The problems of reproducing the maps must have been many, and they seem to have been solved as well as resources permitted. The reduction of some of the maps has made various place names and symbols hard to read without a magnifying glass. However, the maps are really tools to work with and the very existence and availability of this collection offsets such minor inconveniences. In the preface the author has made a number of significant remarks concerning the properties of the early maps and the way in which they should be interpreted. In pointing out the origin and relative significance of such features as the distortions which often confuse and dismay the novice, the author has outlined a sound approach to the proper and complete interpretation of the maps.

The collection of maps is advertised as a selection of the materials being assembled by the Ethno-History Program of the University of Chicago. We look forward to the second volume of this series in which the documents and other data pertaining to the maps will be reproduced. These two volumes should be extremely important tools, usable by several fields of research. We also hope that the program can continue beyond the production of these basic data, so that eventually we may profit by interpretations borne of long association and familiarity with the wealth of information which is being amassed.

FREDERICK JOHNSON
R. S. Peabody Foundation
Andover, Massachusetts

Survey and Excavations in Southern Ecuador. DONALD COLLIER and JOHN V. MURRA. (Anthropological Series, Field Museum of Natural History, Volume 35, Publication 528, Chicago, May, 1943.)

North American scientific archaeologists in general and The Institute of Andean Research in particular have good reason to be proud of this monograph on the archaeological content of a part of the southern highland region of Ecuador. The work upon which it is the report was done in 1941, and it was done in the most cordial kind of cooperation with Ecuadorian officials, with the National Academy of Ecuador, and with numerous Ecuadorian citizens. Valuable help was received also from North American

diplomats in Ecuador and from two well-known North American archaeologists already at work in another field of Ecuadorian archaeology. With the Expedition, as an observer, was the well-known Ecuadorian scientist, Dr. Anîbal Buitrón Chaves. In the extensive bibliography of this work, one notes with pleasure the names of numerous Ecuadorian colleagues of ours. It was, in short, a beautiful proof, in scientific guise, that Good Neighborliness *does* work.

The results obtained are highly important. Various sites, chief among them Cerro Narrío, near Cañar, were examined with care and skill. Seriation and comparative chronological position of cultural types were solidly established by scientific, stratigraphical digging. Certain delusions and misconceptions were thoroughly exploded. There was found to be very little, if any, influence from Maya sources, although some influence from Colombia was found. This is well. More disturbing to one who, like the reviewer, must plead guilty to long years of belief in a real Tiahuanaco II period in Ecuador is the revelation that there is only a very faint trace of such a thing.

Still, facts are facts and must be faced, even if it means jettisoning all one's fondest dogmas. The truth here made apparent is that real influence from Peru is confined to four pots of Late Chimu type found at or near Cerro Narrío and Cañar (Pl. 46, Figs. 4–7), one Chavín style pot (the most sightly one shown in the work) from Azuay (Pl. 10, Fig. 4), and twelve Inca style pots from Cañar, Azuay, and Cerro Narrío (Pl. 45, Figs. 1–9; Pl. 46, Figs. 1–3). Of pottery or other artifacts clearly and indubitably influenced by or proceeding from Tiahuanaco culture there is not one.

This is sad, but inescapable. One derives what comfort he can from that single beautiful Chavín style pot from Azuay. After all, Chavín must have had some sort of connection with Tiahuanaco II, though what and why only the Viracocha figure on the Monolithic Gateway at Tiahuanaco can tell, and he is stonily silent.

In their Conclusions, pp. 86 to 90, Drs. Collier and Murra do vouchsafe a crumb of comfort to the ex-believer in the Tiahuanaco II period of Ecuador. They say:

> The region included in the Azogues-Cuenca-Cumbe-Sigsig-Paute pentagon is one that demands most immediate survey and excavation. Stratified sites probably exist there, and careful work will check our Cañar chronology as well as extend it. The placing of Tiahuanaco influences, suggested by the Chordeleg gold artifacts, into our Cañari chronology will also be very helpful. Finally, the relation to other Peruvian cultures such as Chavín and Chimu might be cleared up. (p. 89)

Altogether, this is by far the most important contribution to its subject, in English, that has been published for many years. Drs. Collier and Murra, with this monograph, take their place alongside Saville, Jijón, Verneau, and González Suárez in the forefront of writers on Eucadorian archaeology.

PHILIP AINSWORTH MEANS
Pomfret, Connecticut

NOTES AND NEWS

APPOINTMENTS BY THE PRESIDENT

In accord with Article VII of the Constitution, President Haury has appointed the following committees:

Budget Committee; the Executive Committee

Auditing Committee; Leaman F. Hallett, *Chairman*, Roger Wilson, Maurice Robbins.

Nominating Committee; W. C. McKern, *Chairman*, Neil M. Judd, Glenn A. Black.

Program Committee; Douglas S. Byers, *Chairman*, A. V. Kidder, Frederick Johnson.

NOMINATIONS FOR NEW OFFICERS

Before the annual meeting the Nominating Committee will consider the names of persons to be nominated for the positions of President, two Vice-presidents, and two members of the Council. Members are invited to make any suggestions regarding the names of persons to fill these offices to the chairman of that committee.

THE ANNUAL MEETING

The Council has approved May 13 as the date of the next annual meeting. The meeting will be held in Washington, in the assembly room of the Cosmos Club.

Although the Co-ordinator of Transportation has requested that Societies not connected with the war effort dispense with meetings, it was felt that because the last elections and the amendment to the Constitution were effected by the Executive Committee subject to the review of the Society at the next annual meeting such a meeting should be held this year. As many members of the Society are now resident in Washington, or nearby, it was felt that a minimum of travel would be involved if the meeting were held in that city.

While the meeting will be primarily for the purpose of transacting the business of the Society, the Program Committee is inviting members who wish to deliver papers to submit them to the Committee for consideration. All papers should be in the hands of the Chairman of the Program Committee, Douglas S. Byers, Box 71, Andover, Mass., not later than April 1. It is hoped that time will be available for two sessions at which papers may be delivered and discussed.

ERRATUM

Mr. John M. Goggin has discovered a rather serious error in his article "An Archaeological Survey of the Rio Tepalcatepec Basin, Michoacán, Mexico" published in Number 1 of this volume.

Page 56, line 32, last two words should read "El Chandio" rather than "La Palma." The sentence reads, then, "Over one hundred fragments were examined from *El Chandio* alone."

LICHTSTERN RESEARCH ASSISTANTSHIP IN ANTHROPOLOGY

The University of Chicago has instituted the Lichstern Research Assistantship in Anthropology.

The assistantship, carrying a stipend of $1,000 for nine months' work, will be filled each year in which a suitable candidate appears on nomination made by the Chairman of the Department of Anthropology. The incumbent will devote most of his time during the year to performance of a piece of library, laboratory or field research, although he may also take one course or seminar each quarter. Applicants for the position will be asked to submit their research plans.

The assistantship is supported by the Lichtstern Fund and commemorates Mr. Adolph Lichtstern who created the Fund by bequest.

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Bibliographies must follow a standard form; citations from journals should be given as follows:

JENKS, ALBERT E. AND LLOYD A. WILFORD.
1938. "The Sauk Valley Skeleton." *Bulletin of the Texas Archeological and Paleontological Society*, Vol. 10;

citations of separate books or reports:

JENKS, ALBERT E.
1936. *Pleistocene Man in Minnesota.* University of Minnesota Press.

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